COMMERCIAL REFRIGERATION

Recent Developments in Freezing & Hardening of Ice Cream

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IN discussing the subject "Recent Developments in the Hardening of Ice Cream" it is difficult to decide the period of years that should be designated as "recent." Going back 25 years—the time when I became actively interested in the commercial manufacture of ice cream—I can recall some of the drastic changes which were being made at that time. It was then that ice cream manufacturing was undergoing the fundamental change from an individual's occupation to an industrialized industry.

There are still many tub freezers in use, but the larger plants were using salt and ice brine freezers, and some of the more modern plants were installing mechanical refrigeration with brine freezers. Much of the ice cream was hardened in salt and ice bins, and some in tanks of brine.

Trade Secrets Guarded

Up to that time there had been no research work on the subject of ice cream manufacturers. It was really a back room or basement business and the trade secrets were guarded most cautiously.

Significant changes took place 20 to 24 years ago. As plants grew, mechanical refrigeration was installed and with it came mechanically refrigerated brine tanks, brine drip hardening rooms, and later dry air hardening.

Looking over the programs of various ice cream manufacturers' conventions of 20 years ago, it appears that the main topic for discussion was "still air versus blast hardening." Both of these systems had their champions. Although the principle of blast hardening was sound, the design of the systems and construction of the fan motors of that time were faulty.

Blast Systems Changed

Plant owners soon lost their patience and within a couple of years most of the blast systems were changed over to still air. Still air rooms reigned supreme for a number of years, but during the past few years the tendency has been toward forced air hardening.

Paralleling the changes in hardening mentioned above, there were significant changes in the design and operation of freezers and also in the standardization and preparation of ice cream mixes.

The salt and ice brine freezers were of the 5 and 10-gallon capacity, operated with a 10° F. brine, and the dasher travelled about 150 r.p.m. When the mechanically refrigerated brine was installed, the freezers were operated in a very similar manner.

It was not long, however, before plants wanted to speed up operations. This demand was met by the building of larger capacity, high speed freezers. They were operated with zero brine to speed up freezing operations. These freezers called for a mix that would withstand these operations without churning. Hence the advent of standardized and homogenized mixes.

More Speed Demanded

Fast freezing developed so successfully with brine freezers that there came the demand for even more speed in freezing operations. The machinery designers brought forth the latest developments—direct expansion batch and continuous freezers—the last word in freezer development.

While these changes were going on with mechanical equipment, there were other significant things happening in the industry. Research workers became interested in the problems of the industry and many valuable studies have been made during the past 20 years.

The various components of ice cream mixes were studied and definite recommendations for standardizing and treating mixes were worked out. Researches were made on the freezing and hardening of the product. All of these have been vital to the present-day development of the ice cream industry.

A brief review of some of these studies gives us a better understanding of some of the factors affecting the proper freezing and hardening of the product.

A desirable mix is one which has the proper composition to satisfy the palate of the consumer. It must have the desired richness, smoothness, resistance and flavor. Furthermore, from the manufacturer's standpoint it must whip rapidly to the desired overrun and freeze quickly.

Studies have shown that because butterfat is in a colloidal solution in the mix, it does not affect the freezing point. However, if the fat content is raised and the remaining solids are unchanged, the resulting mix will have a lower freezing point due to the concentration of the non-fatty solids in the smaller amount of water. High fat mixes do not whip as readily as lower fat mixes.

Milk solids-not-fat are important since they have a stabilizing effect upon the fat emulsion and assist in obtaining the desired body and overrun. Increasing the serum solids decreases the freezing point of the mix.

Effect of Sugar Content

The sugar content has a direct bearing upon the freezing and hardening qualities. The higher the sugar content, the lower the freezing point. This tends to prolong both the freezing and hardening processes. Furthermore, a high sugar content reduces the whipping quality.

Stabilizers such as gelatin are desirable since they retard the formation of large ice crystals and thus aid in the production of a smooth product. However, the addition of these products tend to reduce the whipping qualities of the mix, thus prolonging the freezing process. Consequently, it is wise to use the minimum amount of these products necessary to give the desired stabilizing action.

Studies have shown that the addition of egg yolk to an ice cream mix will improve the whipping qualities of mixes—especially those having a high fat and sugar content—and will, therefore, shorten the freezing period. This is important as it aids in increasing the freezing capacity of a plant.

Ice Cream Improvers

There are various products on the market sold under the general term of ice cream improvers. Some of these are of doubtful value although they may improve improperly prepared mixes to a slight degree. Investigations have shown some of these products to be detrimental since they may cause a shrinkage in the ice cream during storage or while it is in dealers' cabinets.

Some investigators have shown that the addition of sodium citrate and phosphate salts may improve the whipping qualities of some mixes, whereas certain calcium salts retard the whipping. Here again are factors which may affect the freezing capacity of a plant.

The treatment of the mix before freezing has received considerable attention by investigators. The proper homogenizing of the mix has proven to be an essential process in ice cream manufacture. Mixes which are homogenized properly will whip faster than unhomogenized mixes. Homogenized mixes can be frozen in high speed freezers without churning. This is not possible with unhomogenized mixes.

Aging of Mixes

The proper aging of mixes is beneficial since it improves the whipping qualities of a mix. However, a long aging period is not essential in a modern plant since the newer methods of processing and freezing assist in improving the freezing qualities of the mix.

The cooling of a mix before aging is important. Slow cooling to the storage temperature of 40° F. increases the viscosity of the mix and this retards whipping; whereas rapid cooling to storage temperature improves this quality.

The mix should be cooled to near its freezing point before it enters the freezer. This is an important factor in conserving freezing capacity.

There are four operations that take place during the freezing process: (1) cooling the mix to the freezing point; (2) removal of the latent heat of freezing; (3) whipping to the desired overrun; and (4) slight supercooling to below the freezing point.

The factors affecting these operations are: composition of the mix, whipping quality, temperature or refrigerant, amount of refrigerant passing through the freezer per unit of time, speed of the dashers, and condition of the dashers. When the batch freezer is used, the conditions under which the freezer is operated are manually controlled.

The results are directly in proportion to the operator's ability. When the continuous freezer is operated some of these factors are controlled automatically, but extreme care is essential for the proper adjustment of the freezer during operation.

The faster a mix is frozen—other things being constant—the finer the ice crystals and, therefore, the smoother the ice cream. Consequently, plants are striving toward this objective—fast freezing.

Vogt Continuous Freezer

The Vogt continuous freezer is one of the most important developments along this line. In this freezer the product is frozen in such a short time that it is called "instant" freezing. Experiments have demonstrated that this method produces an ice cream which is smoother and more resistant than ice cream frozen in a batch freezer.

Furthermore, it delivers the ice cream at a lower temperature (about two degrees), at the same time maintaining the desired overrun. This feature is an important one since it helps to maintain a desirable texture and body.

Ice cream, so far as its body and texture are concerned, is at its best when it is drawn from the freezer. The processes which have taken place up to that time the ice cream is drawn from the freezer are responsible for producing the good qualities.

Handling after Freezing

The care with which the ice cream is handled after it leaves the freezer determines how well these qualities are retained. The best hardening and storage processes do not improve the ice cream, but they do protect the product so that these good qualities obtain until the ice cream reaches the consumer.

Ice cream should be drawn from the freezer, packed in containers and started to harden in the shortest time possible and with the least increase in temperature.

Allowing ice cream to warm up a half a degree or more in temperature after drawing from the freezer produces defects which cannot be corrected. Insulated and refrigerated conductors from the freezer to packing rooms are of assistance in obviating this difficulty. When a cold packing room is not used, chilling the packers is of some help.

The more rapidly ice cream is hardened, the better. It must be remembered that although we speak of the ice cream as being frozen in the freezer, there is from 30 to perhaps 50 per cent of the water in the mix that must be frozen in the hardening process. Therefore, the more rapidly this can be frozen the less chance there is for large ice crystals to form and the smoother will be the product.

Rate of Hardening

In general, the rate of hardening ice cream depends upon the amount of heat to be removed and the rapidity with which the heat is conducted away from the product.

The heat removed from the ice cream during the hardening process consists of the sensible heat of the ice cream and the latent heat of the water that is frozen into ice during the hardening period.

The percentage of unfrozen water is a function of the temperature of the ice cream. Therefore, the drawing temperature at the freezer is directly related to the percentage of water frozen and consequently to the time required to harden the ice cream.

Experiments conducted by P. H. Tracy and C. Y. McCown of the Department of Dairy Husbandry, University of Illinois, have shown that in the case of ice cream containing 13 per cent of fat, 11 per cent of serum solids, 14.5 per cent of sugar, only 35 per cent of the water in the mix was frozen at 25° F., 52 per cent at 22° F., and approximately 82 per cent at 0° F.

Result of Freezing Trials

Freezing trials demonstrated that the ice cream in 5-gallon metal cans drawn at 22° F. hardened in 13.4 hours in a still air hardening room at —18° F., whereas the same ice cream drawn at 24.5° F. required 15.7 hours, or approximately 17 per cent more time. These results point out clearly the necessity for drawing ice cream from a freezer at as low a temperature as possible in order to hasten the hardening process.

The research work of these investigators brought out other interesting facts concerning the hardening of ice cream. These results will be stated briefly.

The percentage of overrun has a slight effect upon the hardening process. This effect is directly proportional to the number of heat units to be removed. Low overrun ice cream contains more water per unit volume than high overrun ice cream and, therefore, requires a greater removal of heat units.

Unfrozen Water in Mix

The composition of the mix has a marked effect upon the rate of hardening. Variations in the soluble constituents of ice cream have a direct bearing upon its freezing point. This causes differences in the drawing temperature and also in the amount of unfrozen water in the ice cream at drawing time.

As the freezing point of the mix is lowered there is an increase in the amount of unfrozen water in the ice cream at drawing time. Ice cream drawn at the same temperature, therefore, may not be hardened in the same time since the rate of hardening is directly affected by the amount of unfrozen water present in the ice cream when it enters the hardening room.

Use of Circulating Fans

During the past few years rather extensive use has been made of circulating fans in hardening rooms. Investigations were carried on using a 24-inch fan having an air velocity of 1500 linear feet per minute. Hardening rooms of identical size were used in comparing the rate of hardening ice cream with and without the use of forced air circulations.

A film of still air is very effective as an insulator against heat flow. Calculations show that a film of still air of only 0.01 inch in thickness has as much resistance to heat flow as a steel wall 20 in. thick.

The film surrounding the packers of ice cream and the expansion pipes is effective in retarding ice cream hardening: whereas, the effect of the packing cans is negligible. Forced air circulation is effective in sweeping away this air film. Tracy and McCown have shown that by using a circulating fan, a 50 per cent saving in Hardening time could be obtained when hardening ice cream in 5-gallon cans in a room at —18° F.

When the ice cream was in smaller containers a greater saving in hardening time was obtained, since the hardening time is dependent upon the area and shape of the package.

The test showed that when a fan was used, the refrigerating system could be operated at a higher back pressure and still maintain the desired temperature in the hardening room. Thus operating costs are reduced by forced air circulation.

Position of Fan and Ice Cream

The relative position of the fan and ice cream is important. The packers should be so arranged in the room as to permit the maximum circulation of air around each can.

Painting the outside of metal containers black saved 15 per cent in hardening time when 5-gallon packers were placed in a still air room. However, there was little saving in time when painted cans were placed in currents of forced air. This was true because in forced convection currents the amount of heat transferred by radiation is greatly reduced.

Effect of Paper Liner

Hardening ice cream in a —20° F. still air room showed that paper liners in 5-gallon cans increased the time of hardening less than 2 per cent. Ice cream hardened faster in paper containers than in steel cans. Fiber containers conducted heat from ice cream more rapidly than either paper or steel cans. Painting fibre containers did not alter the rate of heat transfer indicating that the fibre surface was a good radiator.

The results mentioned above have meant much to the industry. New developments have been made based upon such facts. Hence we have the "instant" hardening of packaged ice cream. It remains for the refrigerating engineer to design hardening systems that are even more effective than those which are now in use.

*Talk given before the annual convention of the National Association of Practical Refrigerating Engineers, Nov. 1, 1934, in Springfield, Ill.

Seeger Equipment in New Market

The brand new Bunker Hill market in Waterbury, Conn., has been equipped throughout with Seeger commercial refrigerators and accessory equipment such as vegetable stands, wrapping counters, etc. Frigidaire refrigerating equipment was installed by the Connecticut Light & Power Co. of Waterbury.

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ELECTRIC REFRIGERATION NEWS

WRITTEN TO BE READ ON ARRIVAL

Registered U. S. Patent Office

ESTABLISHED 1926. MEMBER AUDIT BUREAU OF CIRCULATIONS. MEMBER ASSOCIATED BUSINESS PAPERS. MEMBER PERIODICAL PUBLISHERS INSTITUTE.

VOL. 13, NO. 16, SERIAL NO. 300
ISSUED EVERY WEEK

Copyright, 1934, by Business News Pub. Co.

DETROIT, MICHIGAN, DECEMBER 19, 1934

Entered as second-class matter Aug. 1, 1927

THREE DOLLARS PER YEAR
TEN CENTS PER COPY

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'35 Gibson Has Flat Evaporator & Modern Lines

Black Panelling Accents Cabinet Design in 1935 Models

By Phil B. Redeker

GREENVILLE, Mich. — Incorporating a considerable number of new features—chief among them being the "Freez'r-shelf" or flat evaporator — a 1935 line of household electric refrigerators with a distinctive modernistic cabinet design has just been introduced by Gibson Electric Refrigerator Corp.

The "Freez'r-shelf" as may be seen from the illustration below, extends all the way across the width of the cabinet interior at the top. It is sufficiently removed from the top to make room for double-depth ice cube trays.

Gibson officials claim that this flat evaporator permits faster freezing, greater ice-cube capacity, and increases the storage space of net cubic contents of the cabinet because it allows a more systematic arrangement of the shelves.

Fingertip ice tray release is made possible by giving a slight upward "push" to the front plate which covers the evaporator shelf.

Gibson's 1935 household models were styled by Richard Bolton Janes. Modern lines, black trim, centered crest, and modernistic hardware with torpedo-shaped hinges make the new models quite different in appearance from other refrigerators Gibson has presented in years past.

The door panel is superimposed on the side panels and extended to meet the top of the cabinet at right angles, the sides curving gracefully into the front panel just below the top of the cabinet. A black strip outlines the point at which the front and side panels meet, this strip curving into the bottom to meet the black kickplate, which takes the place of legs.

The foot pedal for the door opening device is in this kickplate.

A host of convenience features have been incorporated in the new Gibsons. Principal new convenience feature is a rack on the inside of the door for

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Stewart-Warner to Use 1-Cylinder Compressor

CHICAGO — Stewart-Warner Corp. gave its refrigeration distributors a preview of its new heavy duty single-cylinder compressor at a series of preview meetings held this month.

According to Charles D'Olive, refrigeration sales manager, the single-cylinder compressor includes all the proven features of the Stewart-Warner 1934 twin-cylinder unit, and that no startling changes have been made in the mechanism or design.

Distributors were also given an insight into 1935 sales plans. One group of distributors came in for two days of the first week of December, while the second week found three groups assembled in succession.

Meetings were addressed by Frank Hiter, vice president and general sales manager; A. B. Dicus, sales promotion manager; and Mr. D'Olive.

"We are not ready as yet to release details of our advertising and sales promotion plans," declared Mr. D'Olive, "as their completion depended in part upon suggestions from our distributors during these get-togethers.

"We also obtained distributors' opinions on details of shelf arrangement, escutcheon plate design, hardware and other minor angles that make for smarter styling and more effective 'eye appeal'."

Garceau to Promote Conditioner Sales

DETROIT — Vance C. Woodcox, Kelvinator advertising and sales promotion director, announced last week that John S. Garceau had been appointed advertising and sales promotion manager of the company's air-conditioning division.

Mr. Garceau has been with Kelvinator since 1927, the past three years as domestic advertising and sales promotion manager. From 1921 to 1925 he had charge of advertising for Detroit Graphite Co., following that connection with two years as director of advertising and sales promotion for Truscon Laboratories.

Mr. Garceau directed the exhibit of Kelvinator at the 1934 Century of Progress exposition.

Atwater Kent Starts Shipping 4-Model Line

Food Racks on Door Is Prime Feature of Refrigerator

PHILADELPHIA—Atwater Kent is now in quantity production on its new four-model line of household electric refrigerators at its plant here and shipments are going forward to distributors, it was announced last week by A. Atwater Kent, president.

This announcement comes as a flat contradiction to the rumors which have been circulating around the industry that Atwater Kent would not get into the refrigeration business actively this year.

Atwater Kent distributors will meet here tomorrow (Dec. 20) when prices and the merchandising program will be announced.

Outstanding feature of the new Atwater Kent models, from the user standpoint, is the six-level food rack suspended from hooks on the inner side of the door. These racks are designed to hold eggs, fruit, and small containers.

All models will be equipped with the same condensing unit, a conventional-type, methyl chloride machine. The compressor will be powered by a General Electric capacitor-type motor, built for high starting torque and quiet operation.

The interior of the cabinet is a one-piece porcelain compartment, with an all-porcelain freezing unit centered at the top, affording food storage space on both sides. On all but the smallest model, the freezing unit has a self-sealing chromium-plated door.

Cabinet exterior has an all-white finish. The cabinet is conservatively styled, all vertical edges being nicely rounded. Base of the cabinet is one piece, with tip of extended legs being finished in black.

Hardware is modernistic, the torpedo-shaped chrome hinges having black tips. The two-way latch oper-

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Preview of '35 Program Given by Westinghouse

MANSFIELD—Two hundred Westinghouse refrigeration distributors, supervisors, and sales promotion managers were given the advance "dope" on product and sales plans for 1935 at a convention held Dec. 3, 4, and 5 at the factory here, it has been announced by R. C. Cosgrove, manager of household refrigeration sales.

Details of the 1935 Westinghouse refrigeration line and sales program will be announced at a later date, at which time they will be published in ELECTRIC REFRIGERATION NEWS.

The convention was held in a new auditorium recently built at the Mansfield plant. In addition to attending the sales and advertising clinic, the men were taken on trips of inspection through the revamped Westinghouse plant here, on which $200,000 was spent recently to enlarge refrigeration production facilities.

At the convention the Westinghouse Refrigerator Distributors Club was formed, with Ingraham elected president, R. E. Imhoff, vice president, and H. T. Pritchard, secretary.

Principal speakers in presenting the Westinghouse program were Mr. Cosgrove; A. E. Allen, vice president; P. Y. Danely, manager of the refrigeration department; and H. M. Wible, manager of commercial refrigeration sales.

Cities Told to 'Go Ahead' On Power Plans by TVA

CHATTANOOGA, Tenn.—Tennessee Valley Authority Director David E. Lilienthal last week told mayors of several cities in the south to "go ahead" with the construction of municipal power plans to handle surplus TVA power for which they have contracted.

The cities had been holding their plans in abeyance pending efforts to buy the existing privately-owned power distribution facilities.

In effect, Mr. Lilienthal stated that the patience of the TVA was exhausted. He advised the mayors by letter to proceed with the construction of their own distribution systems.

Chief Engineer

CLYDE E. PLOEGER
He will direct Servel engineering.

* * *

Ploeger Will Head Servel Engineering

EVANSVILLE, Ind.—Clyde E. Ploeger has been appointed chief engineer of the commercial refrigeration division of Servel, Inc., according to Harry Newcomb, manager of that division. Mr. Ploeger's appointment is a further step in the unifying of all activities within the commercial division.

Ploeger has been a member of the Servel engineering department since 1925. He has served the Servel engineering division in many different capacities, and for the last several years had served as research engineer in the electric division.

A native of Evansville, Ploeger attended Purdue university, graduating in 1923 with an electrical engineering degree. His period of employment with Servel began soon after.

His most notable work in the engineering division has had to do with the development of Humidraft, Servel forced convection unit, and with Servel's line of air-conditioning equipment.

Norge Explains Expansion Plans To Distributors

Refrigerator Prices Start at $119.50; Gas Ranges Are Introduced

By Elston D. Herron

DETROIT—A scad of newsworthy events and announcements attended the four-day convention staged by Norge Corp. in this city last week to gets its distributors and factory field men loaded for a record-blasting 1935. Important were:

1. Showing of the '35 household refrigerator line, which will comprise 11 models ranging in price from $119.50 to $369.50 f.o.b. and in size from 4.25 cu. ft. to 11.17 cu. ft. This does not include the E-231, chest model with a capacity of 2.31 cu. ft. Styling of this line is practically unchanged, and only a few refinements have been made in the mechanism.

2. Preview of the new Norge gas ranges, of which there are four, with a retail price range of approximately $59.50 to $129,50. The stoves are made by the Detroit Vapor Stove Co., recently acquired by Norge's parent organization, Borg-Warner. They are extremely stylish and available in a variety of color combinations.

3. Long-awaited announcement of the Norge commerical refrigeration line, consisting of 10 air- and water-cooled rotary models, extending up to 1½-hp. Three models are already being shipped; others will roll off the production line in February. The company is also making a line of commercial coils.

4. Introduction of Norge range-refrigerator color combinations. The two appliances will be offered as a pair, both finished in the same colors. Four finishes will be available—buff, white, green, and a greenish tan—all in a mottled marble effect. Only 6- and 7-cu. ft. refrigerators are available in these ensembles.

5. Two key men of the Norge sales organization are moving from the field to Detroit headquarters. Glen O'Harra, for years eastern sales man-

(*Continued on Page 2, Column 1*)

The New Gibson - - Inside & Outside

Marian Gommeson operates the ice tray release which frees the trays from the flat evaporator of Gibson's 1935 models. Insert shows how the cabinet exterior has been styled.

Three Famous Presidents

President Howard Blood of Norge (standing) and President George Mason of Kelvinator at the Norge banquet. Executives of the Refrigeration Division of Nema were guests. The portrait in the center, in case you can't quite place the face, is that of George Washington.

Norge Describes Big '35 Program To Distributors; New Lines Shown

(*Continued from Page 1, Column 5*)

ager, will supervise range sales. R. E. Densmore, veteran western sales manager, is to have charge of all distributor contact work.

6. Norge is going in strong for "mass selling" in 1935. A play featuring Norge products has been written and is ready to go on the road. A three-reel Norge sound movie is going into the hands of distributors. The factory home service staff will be boosted to more than a dozen members, to hold literally hundreds of cooking schools next year.

7. The company will carry on the most extensive advertising and sales promotion campaign in its history. An appropriation of $2,000,000 has been set aside for this purpose, compared with $1,250,000 in 1934.

Spirited Convention

This distributor convention was the best in the history of Norge, one of the chief reasons for its good spirit being that the company's '34 refrigerator business is 175 per cent over 1933 volume, according to Vice President John H. Knapp, who ran the show and was in even better form than usual.

Under the direction of Gerald E. Stedman, vice president of Cramer-Krasselt, Norge advertising agency, 13 market surveys were made after the heavy selling season of this year, and findings of those studies will be the basis for every phase of selling used by Norge next year.

Only minor changes have been made in the exterior of the new Norge household refrigerator. The forged door hinges now contain coil springs which swing the door wide open when the latch is tapped. These hinges are fastened on with bolts instead of screws.

Screws on the door handles are now concealed, and no longer are there any "buttons" on the cabinet top, as there were last year. In some models the insulation has been thickened and evaporator tubes made larger. New shelves are being used in the '35 line; they are 14 gauge, and the cross-wires are laid at ½-in. intervals. Door frame has been strengthened, design of the control knobs has been refined, and the light switch has been changed somewhat.

Compressor Has New Device

One of the principal changes in the mechanism of the new line is addition of an inertia pulley on the motor shaft to slow down the initial starting speed and prevent light flickering. The motor is mounted differently than last year, the motor pivot being at one side—near the compressor—which effects a tightening of the belt by the motor's own torque when the unit is started.

Several minor alterations have been made to reduce noise. One lessens noise caused by the motor-starting switch, and two double-blade springs have been put in the compressor to minimize noise of the blade.

Pictures, complete specifications, and the entire price schedule on this line will be published in a later issue of ELECTRIC REFRIGERATION NEWS.

Gadgets are prominent by their absence in the 1935 Norge as it is brought off the production line, but there will be plenty for the buyer who wants them, for they may purchase a Norge "gadget package."

Introduced by Howard E. Blood, Norge president, the package contains a complete white crockery set of refrigerator accessories, which dealers may buy separately and sell to any customer at a standardized price. The set contains a 1¾-qt. water bottle or cocktail shaker, a mixing or egg bowl, two holdover dishes, a butter dish, and an enameled "Hydrovoir" (vegetable hydrator).

Sherman Shows Ranges

The Norge range line was introduced by Al Sherman, engineering head of the Detroit Vapor Stove Co., who played a major part in designing the stoves.

Lowest-priced model is mounted on high legs, has a top with sliding cover, four burner units, and an oven with rounded corners. It is available in a variety of color combinations.

Other three models have a number of features. One is a circular burner with a series of 60 holes which direct heat toward the center of the utensil above. Over the burner fits a metal piece which catches food drippings and drains them into a pan. This device also conceals the flame holes.

These stoves are constructed of angle iron frames, and the stylish porcelain covers which form the exterior are merely a trim, and have nothing to do with holding the various structural members together. All models also have warming drawers, cooking surface covers, and all but the leader model are set on low, massive legs similar to those on the Norge refrigerator.

'Mae West' Broiler

Highest-priced model is the last word in style, and has several features not a part of its companion models. Besides its oven, it has a warming drawer, utility drawer, and a broiler drawer which, when pulled out to a certain point, lifts the broiled food out of the container and up almost to the level of the stove top, still on its grill.

This is accomplished by means of crossed metal bars fitting into the broiler, which conventioneers dubbed the "Mae West" device, because it makes the broiled food "come up and see me." The broiler also contains a metal plate which Mr. Sherman claims gives the same household cooking effect as is accomplished by the Norge Broilator, commercial broiler.

Also on this range is an electric light, an electric timing clock, and a condiment shelf with an upset-proof compartment for each container.

Distributors were also shown a small three-unit electric range bearing the Norge name. It was built for sale in the TVA territory, but is available for national distribution. Mr. Sherman promised the men that "a complete electric line is coming up."

Announces Other Equipment

Having introduced the Norge commercial line, Commercial Sales Manager Bill Rowles said, "Shortly, we will have a line of milk-cooling equipment—our own compressor and another make of cabinet. We will have water-cooling equipment, too."

Early in the new year, Norge will hold a series of "primary schools" in distributorships for dealers who wish to handle the commercial line, but have had no experience in selling or installing such equipment.

Throughout 1935 the Norge factory, through its distributors and dealers, will make a highly intensive mass-selling drive. It will attempt to reach hundreds of prospects with a single presentation, at the same time continuing in full force the activities of its retail salesmen among individual prospects.

This will be accomplished through three media, all of which were presented to distributors at the meeting. The first is a five-act play featuring Norge. Second is a movie, "Norging Ahead Together," starring the company's products. And third is an enlarged and accelerated program of cooking demonstrations to be held by factory economists or those employed by wholesalers.

Sterling's Plays Shown

Distributors previewed the play at their opening session last Monday morning. Written by J. A. Sterling, sales promotion and advertising manager, and presented by professional stagefolk, it concerns the maneuverings of a pretty wife in getting her husband to buy an electric refrigerator. Then comes the shopping tour and eventual purchase of a Norge, and subsequent buying of other Norge appliances. Last act shows the couple 33 years later, with the Norge household helps still going strong.

The play is one of the best things Mr. Sterling has ever done, chief reason being that while Norge is very much in evidence throughout, there is an abundance of romantic and comedy appeal to keep the prospect from labeling it as boresome advertising. It's really interesting to see.

Two Birds with One Stone

With this production, Norge Corp. will attempt to kill two birds with one stone. Two troupes will present it at the annual Norge dealer meetings in January and February. Housewives will be invited to see the play at the same time the dealers see it, and Norge executives believe the show will turn up some good prospects, and at the same time show dealers how properly to sell Norge and what appeals are most effective with the average prospect.

Termed by Mr. Knapp as the "best painless selling you can find," the Norge movie will be shown by distributors, and followed by home service demonstrations—the film selling the product, and the home economist selling its use value.

Refrigeration is spotlighted in this show, lines for which were also written by Mr. Sterling, with major emphasis again placed on the story, and the Norge idea put across with subtle, gentle thrusts. It is a bit of work in which Playwright Sterling definitely triumphs over Sales Promoter Sterling.

Comments by Knapp

During the first three days, Vice President Knapp gave at least a dozen short but sizzling talks. Among statements which most interested the distributors were these:

"We are facing a new method of selling—mass selling. Not that we can afford to discontinue the work we are now doing; we cannot. But the importance of reaching hundreds of prospects simultaneously, and reaching them painlessly, cannot be overestimated.

"There is as large a potential market for electric washers as for refrigerators. Bulk of washer sales in recent years has been to the white-collared class who bought machines to cut down on laundry expense during the lean years.

"The working man—the fellow who gets his clothes *real dirty*—had his washer long before the white-collar man. The working man's washer is worn out now. He needs a new one. Let's sell him one.

"Basic idea of our 1935 market program is regimentation—taking up lost motion through our entire organization—so that every sales impression and plan will reach the consumer more intact than it has ever before.

"Budget selling is one of our greatest sales tools in 1935. The working class was the first to go out of the appliance market, and now it's coming back. That's the market that can be crashed with a good budget plan."

At the rate of more than a slide a minute, Cramer-Krasselt's Gerry Stedman exhibited charts showing findings in the 13 surveys he completed recently for Norge. Distributors will receive a set of these charts with their yearbooks, but at first glance they learned that according to the surveys:

Approximately 40.3 per cent of the people not now owning an electric refrigerator expect to buy one in '35. Economy, convenience, and health protection rank first among factors which influence a prospect to buy. Beauty's importance is lessening, consideration given to a dealer's standing is increasing, economy is less of a factor than last year, while convenience is more.

Of the people interviewed, 21.7 per cent expect to buy a washer in '35, 15 per cent hope to buy an oil burner, and 27.4 per cent want a new range next year.

Inside, Outside Sales Balance

More dealers took on the Norge line in '34 than any other make. Fifty-one per cent of Norge refrigerator sales are made outside the store, 49 per cent inside. Things most needed to help men sell, in order of their importance, are sales training, more sales proof, better sales tools, more outside selling, and harder work.

Unfair competition is diminishing, and lack of purchasing power was less of a factor in '34 than in '33. Twenty-nine per cent of refrigerator owners interviewed said they need a larger box. Some 88.9 per cent use their refrigerator the year 'round. Electric refrigeration saves the average housewife 10.5 trips per month to the store—a total of 17½ hrs. per month.

Testimony of users was found to be the greatest influence in turning prospects into Norge buyers, and 68.4 per cent of owners interviewed said they did not realize the benefits of electric refrigeration before they bought. Seventy-two per cent of Norge's dealers handle the line exclusively.

Leading Prospect Sources

Friends, Norge owners, and store customers are the three highest-ranking sources of prospects for Norge salesmen. Salesmen said 17 phone calls are needed to locate a good prospect, or 15 canvass calls, or five calls on refrigerator owners. Eighty-six per cent of the Norge salesmen interviewed opined that business will be better in '35.

These surveys, said Mr. Stedman, were conducted among approximately 25,000 consumers, 1,500 dealers of all makes of refrigerators, 25,000 refrigerator owners, 6,000 Norge dealers, 8,000 Norge retail salesmen, 400 Norge wholesale salesmen, 307 department stores, 250 personal shoppers calling at refrigeration dealerships.

The 1935 Norge advertising program was presented to the distributors and field men by Walter Seiler, president of the Cramer-Krasselt agency. He first discussed the value of advertising in general, then talked specifics about next year's program.

"Advertising is simply an auxiliary to your efforts," he said. "It creates a greater market opportunity, so ac-

(*Concluded on Page 4, Column 3*)

PENDLETON'S MUSIC STORE
2 EAST WARREN STREET
PHONE 272
P. O. BOX 208
SHELBY, N. C.
MANOR
ELECTRIC STOVES
ELECTRIC REFRIGERATION
AYTAG
RS. WASHERS
ND RADIO SUPPLIES

December
Seventh
19 34.

Mr. Oliver N. Shaw,
Shaw Distributing Co.
Charlotte, N. C.

Dear Oliver:

We've been reading Stewart-Warner's trade paper ads on Electric Refrigerators and we are glad to know that those people are going to keep up the pace they established this year, and will not make any radical changes in their merchandise this coming year.

We must confess to you that when we took on a few of the Stewart-Warner boxes at the beginning of this year, we did it mostly as a favor to you, because you were so enthusiastic about them.

As you well know, we have sold other lines of refrigeration and we took on this line in a more or less half-hearted way, only to find them much superior in every way to some of the older lines on the market.

The boxes we sold have required no service whatever so far, while service on some other lines we sold, have just about taken all our profits during the free service period, and about all we have heard from the Stewart-Warners, is very complimentary.

Yours very truly,
Pendleton's Music Store,
By W. A. Pendleton

WAP/BP

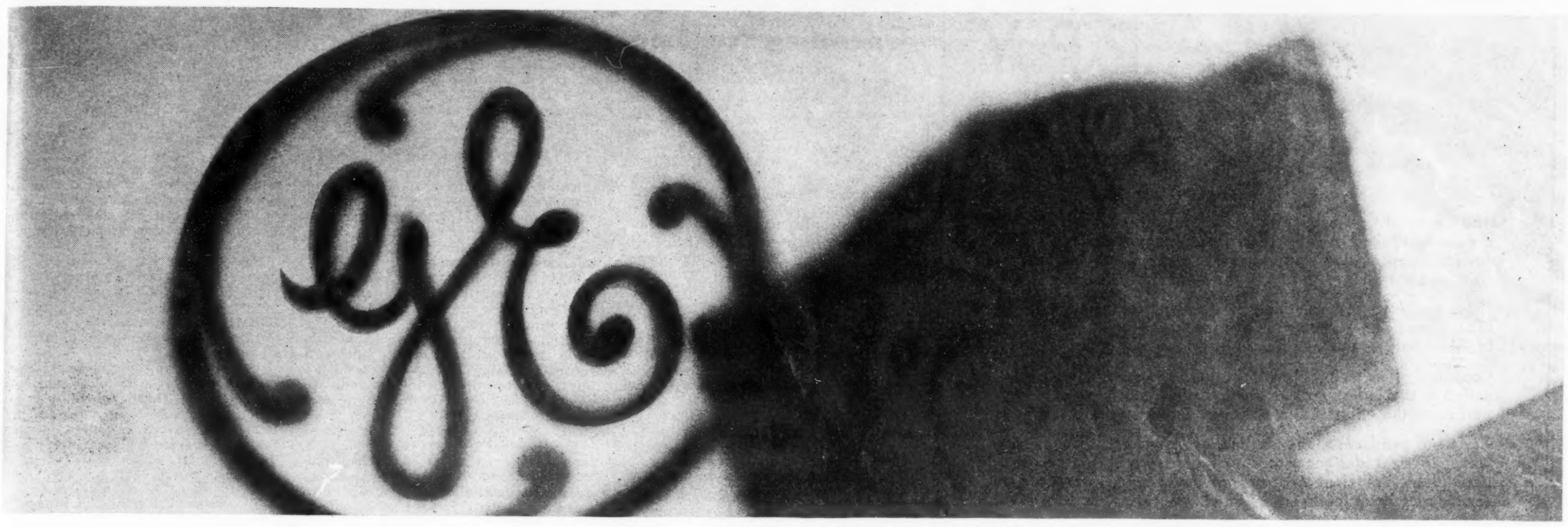
"... required no service"

Now is the time to check up, and decide whether *your* 1935 profits on refrigerator sales are going into your pocket—or into servicing expenses. Hundreds of dealers who handled the Stewart Warner line of electric refrigerators this year report that their Stewart Warner profits are net, because service costs have been practically eliminated.

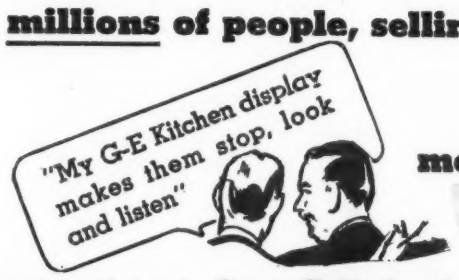
STEWART-WARNER
1841 Diversey Parkway - - - - Chicago

VIRGINIA SMELTING Company
WEST NORFOLK, VIRGINIA
76 BEAVER ST., N.Y. - 131 STATE ST., BOSTON
Extra Dry
ESOTOO
LIQUID SULPHUR DIOXIDE
V-METH-L
METHYL CHLORIDE

ACE HARD RUBBER
Hinged and Sliding
REFRIGERATOR DOORS
Door Frames, Slide Rails, Jambs, Glazing Strips, etc. Standard and special sizes.
Send for catalogue and prices
AMERICAN HARD RUBBER COMPANY
11 Mercer Street, New York, N. Y.
Akron, Ohio—111 West Washington Street, Chicago, Ill.

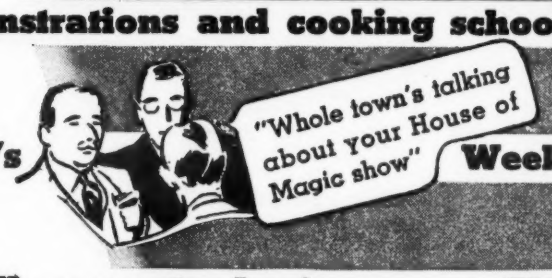


GENERAL ELECTRIC is always a step ahead with new sales-producing plans for the dealer. » » The famous G-E movie "Just Around the Corner" with Bette Davis, Joan Blondell, Dick Powell and Warren William has already played to millions of people, selling them the G-E Kitchen idea, drawing many to the G-E dealer's store. » » That amazing



motorized merchandiser, the General Electric Kitchen Coach, rounds up the business the store cannot get. One G-E dealer doubled his volume in six months with this

G-E store-on-wheels. » » G-E House of Magic demonstrations and cooking schools pack them in to the dealer's store, develop prospects, lead to many a sale. » » G-E's

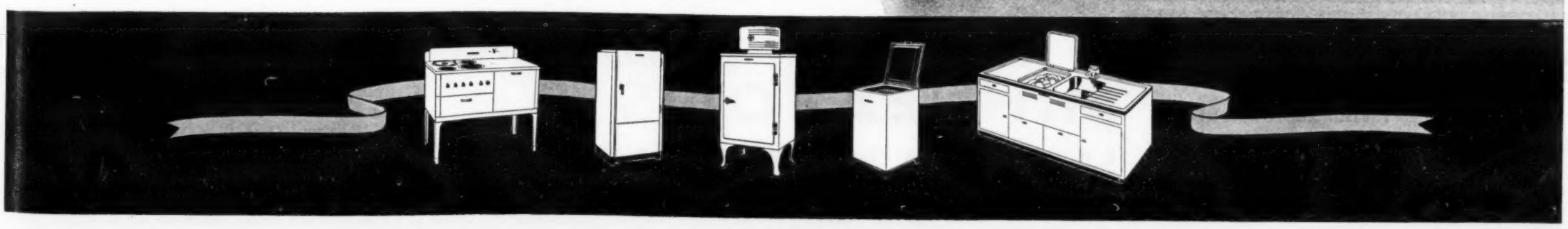


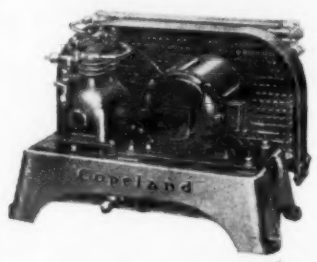
Weekly Menu Service for housewives, personalized with the dealer's name, builds good-will, promotes business. » » The G-E Step-By-Step Plan of buying a General Electric Kitchen

offers the dealer the most effective sales promotor in the history of specialty appliance selling. » » General Electric marches on in 1935 with the greatest assortment of sales-producing plans for the dealer ever assembled. If you

would like to see them, write and we will reserve for you a copy of General Electric's new book—"Sales Helps for 1935". » » The Specialty Appliance Sales Department of General Electric wishes you a very Merry Christmas and a bright and prosperous New Year.

» » General Electric Company, Specialty Appliance Sales Department, Section DF 122, Nela Park, Cleveland, Ohio.





HAPPY DAYS

Distributors of Commercial Refrigeration Units are happy today. They have looked over the record of business transacted during the year, now closing, and found that every month has brought them opportunities for profit.

Those men who have qualified by study of refrigerating possibilities have earned better rewards for the thought and energy invested than would have been possible in any other direction.

Copeland offers to intelligent distributors, a year-round participation in the industry . . . a participation which pays in proportion to the effort and intelligence expended in its service.

Copeland produces a superb line of Commercial Condensing Units, in sizes designed to care for every refrigeration need; dependable, efficient and proven mechanisms; backed by service records of thousands of installations.

If you are not now enjoying the benefits of year-round business, you owe it to yourself to investigate Copeland's proposition.

There are openings available in protected territory for the type of distribution Copeland deserves. Write us TODAY for full particulars.

COPELAND REFRIGERATION CORP., Detroit, Mich.
Main Office and Factory—Holden at Lincoln Ave.
Division of DALLAS E. WINSLOW, Inc.

Copeland
DEPENDABLE *ELECTRIC* REFRIGERATION

Norge to Emphasize Operating Economy

(*Concluded from Page 2, Column 5*)

tually makes your work harder, but more profitable.

"With various types of advertising, we shall try to accomplish three objectives for Norge in 1935. First is to plant the seed of desire for Norge appliances. Second, cultivate and nourish that seed,and third, assist in its fruition until it ripens into a sale.

"National magazine advertising creates the desire, national newspaper advertising assists in cultivating and nourishing that desire, and distributor and dealer advertising ripens it to the real buying stage.

"Our appeal will be placed before the public the year around. Effort will not drop off during the winter, for the best reading months are those in the winter, and with our copy in winter issues, we are bound to get a better reading impression.

Economy Is First Appeal

"Principal appeals in '35 will be economy of Norge refrigeration, convenience, simplicity and sturdiness of the mechanism, and beauty of the line. Testimony-type copy will be employed more heavily than in previous years, and considerable emphasis will be laid on refrigeration's protection of health and food flavor.

"Extensive use will be made of color in Norge advertising in '35. A recent survey showed that colored advertisements brought in 53 per cent more inquiries than black-and-white. Color photography will have an important place in the advertisements, which will appear largely in full-page size.

"Backbone of our magazine campaign will be the *Saturday Evening Post* and *Good Housekeeping*. In addition, we will have a national newspaper campaign, a key city newspaper campaign, and a distributor-dealer campaign."

Of price's place in national advertising, Mr. Seiler asserted, "The place of price is at the end of the cycle, at the point of sale. Often, price is more important in the minds of dealers and distributors and salesmen than in the minds of customers."

The New Deal came up for less than its usual share of mention during the convention, but drew some comment from President Blood, C. D. Donaven, who heads Norge manufacturing, and H. L. Wynogar, president of Commercial Credit Co., official Norge finance organization.

Said Mr. Blood, "The sale of appliances is in the air for next year. Roosevelt's administration is doing everything in its power to encourage the building and equipping of homes. It is in the cards that '35 will be a record-breaking appliance year." He later observed that "sales methods are changing as fast as products and factory processes."

Chief Problem Is Sales

Mr. Donaven asserted, "The solution of the country's problems today doesn't lie with industry, it lies with sales. You distributors must put to work every man you can afford to hire. If you don't you're going to pay for your share of recovery in some other way."

The Commercial Credit head made a business forecast in which he said, "Between now and March or April, we will find an increased buying power. Our hamlets and villages will improve. Early winter months will be a particularly good buying period, and if business is still good in the late spring or early summer, 1935 may produce a small boom.

"We don't need to give much attention to state and national difficulties today. Those things will take care of themselves. Good, hard, intelligent work will solve our *own* difficulties."

Use of C.C. Jumps

Number of Norge dealers making use of Commercial Credit service, and the extent to which they used it, took tremendous jumps during the current year, reported W. H. Crawford, vice president of the finance company.

The year produced a 160 per cent increase in Norge outlets' use of C.C. money over 1933. Last year, 739 Norge dealers used the service; in 1934, 1,567 used it. In '33, a total of $300,000 was used by dealers to finance floor displays, and during the present year that amount rose to $1,200,000, a 400 per cent increase.

An order for full steam ahead has been given the Norge selling organization on washing machine activities during tne new year, declared Dayton Young, washer sales manager.

Early in 1935, a Norge washer broadside will be sent to every washing machine dealer in the United States, and the company will soon open a hard-hitting advertising campaign on this product, with magazines, trade papers, and key city newspapers being used.

Catch-Names Devised

Mr. Young called attention to a number of the Norge washer's features, then announced that six of these have been given names designed to aid salesmen in presenting the product, and stick in prospects' minds more vividly than would the memory of a lengthy technical explanation.

The catch-names are Featherweight Agitator, Plus Four Washing Action, Stickproofing of Agitator, System of Quietors, Distributator Clutch, and Steam Sealed Cover.

Oil burner selling is on the threshhold of a great expansion, declared Harry Whittingham, assistant sales manager, who discussed the company's 1935 program on the Norge Whirlator oil burner and boiler-burner unit which were introduced last summer.

"At the start of the present year, there were 700,000 oil burners in use in this country. By Dec. 31, 800,000 will be installed," he said. "At the present time there is a seven-million-home potential oil burner market, and more than a million home owners who would like to buy an oil burner next season."

Oil Burner Line Expanded

Ralph Beale, in dircet charge of Norge oil burner sales activities, announced that the company has added three larger units to the line introduced last summer. Designated as N-38, N-68, and N-88, they now give the line a range up to 9,500 sq. ft. of steam radiation. Three boiler-burner units are now available along with the six oil burners, too.

During the new season, the Norge Broilator, commercial broiler, will be sold by specially trained salesmen operating out of distributorships. Dealers who wish to sell this product will have the assistance of a Broilator expert in handling sales and installation, said Commercial Manager Rowles.

He also pointed out several minor refinements recently made in the Norge Aerolator, winter air conditioner, then showed that from a sales standpoint, its greatest value to the distributor and dealer lies in the fact that its sale comes under the heading of "plus business."

Greater part of the second morning's session was given over to short talks by key men of the Norge manufacturing staff, headed by Mr. Donaven. These speakers included Ira H. Reindel, chief engineer; Herb Morley; Howard Avery, in charge of rollator manufacture; and Ernie Graham, production manager.

W. H. McKiggan, purchasing agent, told the distributors that during 1934, the refrigeration department used $1,500,000 worth of motors, $300,000 worth of insulation, and $175,000 worth of lacquer.

Harry Spencer, Muskegon plant manager, described a dozen or so improvements made in his factory in preparation for 1935, and announced that the service department has been moved to the Muskegon plant from Detroit.

Jack Cameron, now in direct charge of the company's national service operation, said that immediately after the January-February dealer meetings, his department will complete the series of service training meetings for dealers' men which was begun last summer.

Export Business Leaps

Norge's operations in the export field have gone ahead by leaps and bounds during the present year, said R. W. Gifford, president of the Borg-Warner International Co., and general manager of the Norge export department. During the first 10 months of 1934, Norge ranked third in exports among all refrigeration companies in the U. S.

"During the past 18 months, we have added 30 distributors in as many countries, bringing the total to 35," he said. Listing some of the more important foreign outlets, he remarked that sales have been particularly good in South Africa, and in England.

Norge distributors and dealers will again have a four-season selling campaign, announced Mr. Sterling, who got up from a sickbed to address the last session of the convention.

The Norsemen's Club, for quota-making retail salesmen is being discontinued, he said, but the Viking Club for ace retail men will be carried on in '35 under somewhat revised organization plans. There will be three grades of Vikings, each determined by a specified number of sale points, with the high man in each grade at the end of the year to receive a paid-up annuity policy for his achievement.

Sales promotion literature to be used next year will follow the testimonial-and-proof selling idea more extensively than ever before, he remarked, and said that within a few weeks, a complete 20-lesson training course will be available for every Norge retail salesman.

Gibson Sales Plan Stresses Features

(*Concluded from Page 1, Column 1*)

fruit, small containers, etc. There are also twin chilling trays (suspended from either side of the cabinet), twin dairy baskets, a vegetable bin, and a wall light.

Ice cube capacity has been increased, the smaller model in the new line making 11 pounds at one freezing, and the largest model 15 pounds.

There are four models in the styled Gibson 1935 line, the food storage capacities of the models being 4.75; 5.25; 6.5; and 7.5 cu. ft. respectively. A 4 cu. ft. model with plain cabinet and retailing at $79.50 was announced in the Nov. 14 issue of ELECTRIC REFRIGERATION NEWS.

Gibson's sales organization has evolved a "Straight Line Selling Plan" which will enable the retail salesman to follow all the features of the new refrigerator in a straight line, from top to bottom. This plan, Gibson officials declare, offers an important selling feature on every shelf.

In a sales presentation to a prospect, the "Straight Line" idea is designed to insure the presentation of all important sales features without the possibility of an omission of any material fact that may create interest in the mind of the purchaser. To carry out this plan, special sales literature is being prepared.

Particular emphasis will be laid on local newspaper advertising in cooperation with Gibson sales outlets throughout the country, Gibson officials stated in announcing that a comprehensive advertising program has been prepared.

Famous Store to Handle Crosley Products

WICHITA FALLS, Texas — The Famous Store in Wichita Falls has been appointed dealer for Crosley refrigerators and radios. Showings of various models are already on display on the balcony floor of the store.

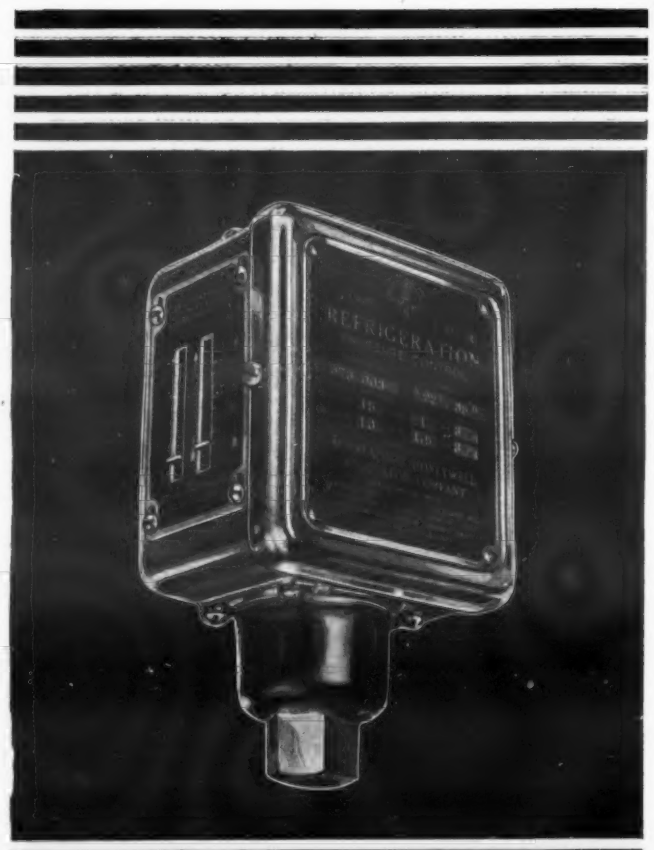
The new department is in charge of Ray Nichols. N. G. Nichols is outside salesman, it was announced by W. E. Smith, manager of the store.

Sell

MORE

. . . than Refrigeration . . . Sell

AUTOMATIC CONTROL



REFRIGERATION PRESSURE CONTROL L141

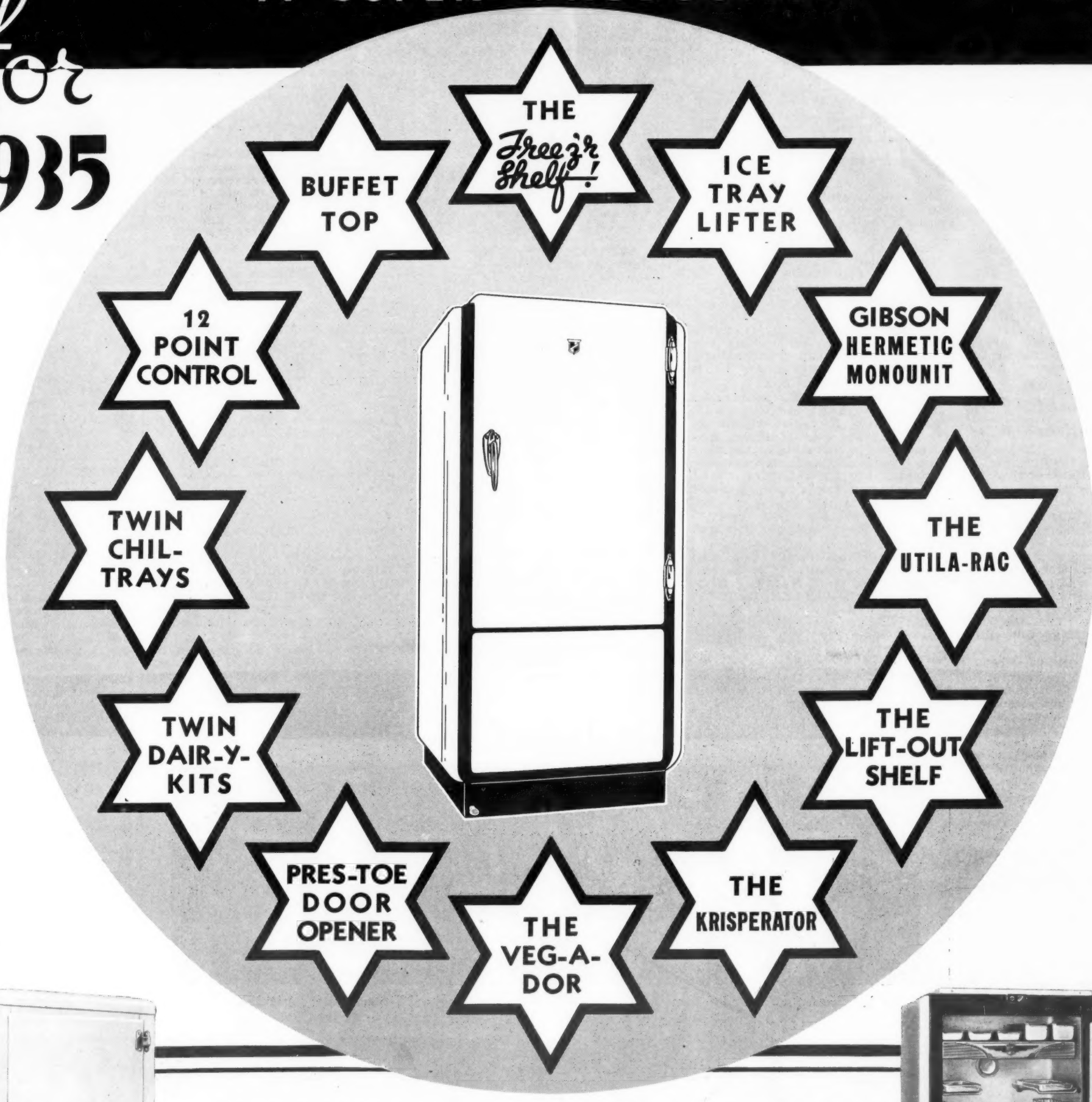
REFRIGERATION is more than merely cooling equipment. Without automatic control much of the effectiveness, the accuracy and the efficiency of refrigeration is wasted. When you sell refrigeration, for all kinds of commercial or air conditioning installations sell automatically controlled refrigeration...automatically controlled by Minneapolis-Honeywell. You'll find these simple, sturdy and dependable controls will guarantee the proper operation of your equipment, with a minimum of installation and service expense. They are available in temperature and pressure ranges to meet any requirements. Minneapolis-Honeywell Regulator Company. 2807 Fourth Avenue South, Minneapolis, Minnesota. Branch or distributing offices in all principal cities.

MINNEAPOLIS HONEYWELL
Control Systems

GIBSON Presents an ALL STAR FEATURE PICTURE

A SUPER PRODUCTION

for 1935



Model B-475

GIBSON'S 1935 MODELS HAVE *Real* SALES PUNCH

Here are FOUR definite reasons why you should investigate the GIBSON Line of Electric Refrigerators for 1935:

1 The GIBSON FREEZ'R SHELF: is an exclusive Gibson development that will make the GIBSON the most talked about refrigerator this year.

It is so entirely new — it has such "sales value" that it will *stop* customers and make them ask a lot of questions. And . . . a good salesman can do a lot with a customer when he gets started asking questions.

2 There is an important "sales feature" on every shelf of any of the GIBSON models for 1935. Open the door and from top to bottom you can find features that will hold consumer interest and make the closing of the sale an easier matter.

3 In addition, intensive sales promotion and "point of sale" advertising will drive home the prestige of the GIBSON organization, backed by its 59 years of exclusive refrigerator manufacturing experience.

4 Dealer and Distributor profit margins are amply adequate and are a definite part of the GIBSON Sales Policy. With the increased volume, which is bound to follow the startling yet practical innovations which GIBSON has originated for 1935, Distributor and Dealer profits will be more liberal than ever.

Model L-705

Look over the many exclusive features — learn about the extensive promotion plans — investigate the liberal profits which are possible with the new GIBSON Line — Write GIBSON for information today.

GIBSON ELECTRIC REFRIGERATOR CORP. *Greenville, Michigan*

Export Sales Department: 201 North Wells Street, Chicago, Ill., U. S. A.
Cable Address: GIBSELCO, CHICAGO — BENTLEY CODE.

See the GIBSON display at the Home Furnishing Show, Chicago, January 7th to 12th, Room 553, Stevens Hotel.

PERSONALITIES

By George F. Taubeneck

Hot Times in the Old Town

Two of the finest sales organizations in the world held conventions simultaneously in Detroit last week—Chevrolet and Norge. As a result the old town boomed. Everybody benefitted—merchants, hotels, night clubs, taxi drivers, and even the Detroit Edison Co. (there was a helluva lot of juice burned every night—hotels were lit up like a Christmas tree until the wee dawn hours).

Norge, of course, kept us busy. Reporter EL HERRON took the day shift, and attended all the regular sessions. The writer went on duty about 7:00 in the evening, and stayed on until 4:00 or 5:00 in the morning. The distributors, who are probably at home in bed at this very minute, went day and night. JOHNNY KNAPP, Norge's dynamo vice president in charge of sales, never slept. But then Johnny never does.

Never has there seemed to be quite so much excitement in the Norge camp as there was this time. Distributors had all made money this year. So had the factory. Everybody was "feeling his oats." And the factory was ready for this feeling.

Norge is ceasing to be *solely* a refrigerator manufacturer, and is entering a period of considerably expanded operations. All varieties of home appliances are to be made by the Norge plants, and sold through the Norge distributors. The corporation is attaining stature and maturity.

* * *

Norge Plays Host to Nema Executives

Coincidental with the Norge distributors convention, the Refrigeration Division of Nema (National Electrical Manufacturers Association) met at the Book-Cadillac hotel in Detroit.

Major HOWARD BLOOD, president of Norge, had a brilliant idea. Why not invite the Nema crowd over to his banquet that night? He did; and although a bit startled, they accepted. All of them seemed to enjoy the proceedings tremendously. And did the Norge distributors get a kick out of seeing at close range the chief executives of leading competitive concerns!

GEOFF JOHNSTON, president of Universal Cooler and chairman of the Refrigeration Division of Nema, delivered one of his highly humorous speeches to the assemblage, and had everyone in stitches. Any time Mr. Johnston gets tired of being an executive, he could earn plenty on the lecture platform. Ask anyone who has ever heard him.

GEORGE MASON, president of Kelvinator and a member of the Nema Board of Governors, was also on the program. As you can see from the picture on the front page of this issue, Mr. Mason sat directly beside Major Blood. He outlasted other visiting executives at the night session, and earned the liking and respect of a large number of Norge men. We'll have some more pictures of Mr. Mason in a later issue of the NEWS.

H. W. BURRITT, well-liked vice president in charge of sales for Kelvinator, was also sitting at the speaker's table. So were R. E. IMHOFF and P. Y. DANELY of Westinghouse, LEWIS CROSLEY of Crosley Radio Corp., CHARLES R. D'OLIVE of Stewart-Warner, W. F. ARMSTRONG of Frigidaire, HARRY NEWCOMB of Servel, THOMAS EVANS of Merchant & Evans, and J. H. SCHROEDER of Sunbeam.

It was a notable assemblage of industry lions, and the Norge distributors were duly appreciative of the honor bestowed upon them by the attendance of the head men from competitors' organizations.

* * *

Cramer-Krasselt on Deck

Cramer-Krasselt men, of course, were there in a body. With the possible exception of Maxon, Inc., and Brooke, Smith & French, we know of few agencies which make such a fetish of attending clients' conventions as does Cramer-Krasselt. And these boys don't just attend—*they help.*

WALTER SEILER, brainy president of the organization, was on hand to offer wise counsel in council. Mr. Seiler is credited by Major Blood with having been of inestimable value in working out the fundamentals of Norge's widely discussed merchandising program; and is still consulted on major matters of policy.

CORRY FAUDE, handsome and personable young account executive, was also on hand. His job chiefly seemed to be that of building and holding good will—which is something he should be good at, for he is instantaneously likeable.

GERRY STEDMAN, public relations man, worked himself into a state of exhaustion. He had so many bears by the tail and irons in the fire that before long he was swinging the irons and heating the bears. We saw him Saturday, after it was all over, and all we have to say is that *you* should have seen him. He looked as if all he were waiting for was somebody to back the wagon up to the door and cart him out.

Other Cramer-Krasselt men who were doing yeoman duty at the convention were L. D. HANSON, H. T. ENNS, F. AUMUELLER, C. TOEPFER, M. E. MOON, and M. McELROY.

* * *

Stiff-Shirted Factory

Apparently deciding that now they had to live up to all this program of expansion and diversification, Norge factory officials went formal. They wore stiff shirts, wing collars, bow ties, and all the trimmings. That is, every night but Thursday night, when Nema came calling. On that night, as if by diabolic prearrangement (which we sorta suspect might have been the case) the only stiff shirt in the house was worn by the mildly embarrassed HALDEMAN FINNIE, manager of the Refrigeration Division of Nema. But Mr. Finnie—who is, by the way, the most capable and cooperative association manager we've met—took it all with very good grace.

Major Blood was there, of course, taking charge of the proceedings with his usual elan and poise. Mr. Knapp had his innings in the daytime, and he cracked a lot of hits out of the park while he was at bat. There's nobody quite like Johnny, and certainly no single man for whom we have more admiration.

H. H. WHITTINGHAM, who is a member of the top inner council, becomes more and more popular with distributors. His suave, good-humored manner, his mature judgment on problems brought to him, and his willingness to help anybody who is in any kind of a jam are making him appreciated more all the time.

H. L. SPENCER, brilliant engineer and plant executive who always gets assigned to the hard jobs, spent much of his time asking questions about how Norge Rollators are holding up in the field. HERB MORLEY and IRA REINDEL, who also have much to do with the guidance of Norge production, also spent much time in quiet and serious conversation with field men and distributors.

JOHN DRAKE and G. G. WHITNEY, who do so many different things in the sales department, made themselves extremely useful. Wherever you went, one or the other or both of them was always opening the door, fetching you some refreshment, introducing somebody you wanted to meet, handing you a program, or pinning a flower in your buttonhole.

C. E. PARKER, the man who conceived the idea of the Broilator, still cooks the best steak sandwiches on that device of any man in the world. Ask GEORGE MASON for his opinion of those steak sandwiches.

* * *

Happy Distributors

All the distributors we saw were happy. That hasn't always been the case. Some of them were pretty glum year before last, and even last year a few weren't so sure the world was a good place to live.

But this year *everybody* felt good. Take the men from the New York branch, for instance — FRANK HUGHES (who is the spittin' image of FRANKLIN D. ROOSEVELT), A. D. McCAUGHNA, L. D. NEWBLOM, and H. WHITNEY—they all had grins from here to there.

From Baltimore came CAL ZAMOISKI, NATHAN ULLMAN, JOSEPH KATZ, and J. ZANDER, all feeling ambitious and prosperous.

Gentlemanly LUDWIG HOMMEL from Pittsburgh is not a man to radiate one thing or another, but quiet questioning revealed the fact that he is proud of Norge's growth, and feels considerable personal satisfaction at the part he has played in this growth over a period of years.

DAVE TRILLING and HARRY MONTAGUE from Philadelphia are always in the limelight, and this time was no particular exception. As usual, Dave made a corking good speech, at the end of which he presented symbolic swords to Major Blood and his associates.

One of our favorite people, scholarly JACK WADDELL of Boston, presented some really good ideas at the meeting. One of them we'll tell you about in detail later (gotta catch a train tonight). Always with him was his bosom pal, genial B. H. SPINNEY, Springfield distributor.

NED VESTAL from Reinhard Bros. of Minneapolis (note character study photograph of this gentleman on this page) gave us some valuable information which should result in a front page story. Keep your eyes open, mister, and you may see somethin'.

ELLIS CHANEY of San Antonio tells us we won't know very much about the refrigeration business until we've been out to Texas, where things are *different.* We hope to remedy that situation very soon.

FRENCH NESTOR of Jacksonville, Fla., was awarded the President's Cup this year for the best quota attainment record. R. P. HARTEN and HARRY KNODEL of Cincinnati, who had won the trophy the last two years and would have had permanent possession of it this year if Mr. Nestor hadn't edged them out of it, received a consolation cup.

Friends A. H. CROWE and A. E. BOTTENFIELD of St. Louis were up, as was GEORGE LEHLEITNER of New Orleans, who is one of the most intelligent young men in the industry.

Fieldman LOVEGREN proudly circulated around among his crack set of distributors: FRED ADAMS of Waterloo, E. O. HUNTING of Denver, E. J. NELLOR and E. J. CONNOR of Omaha, DAVE BURKE of Detroit, and J. W. MILTGEN of Grand Rapids. PETE SAMPSON of Chicago was called home by illness of his wife.

Maybe you get the idea from all the above complimentary words that we sorta like these men in the Norge organization. That's right. We do.

Night Baseball

POWEL CROSLEY, Jr., is apparently applying the same initiative to baseball in his capacity as president of the Cincinnati Baseball Club and director of the National League that he has shown as a manufacturer of radios and refrigerators.

At the most recent meeting of the National League he recommended the trying out of night baseball in the major leagues.

He believes that week-day attendance has become a real problem in the smaller league cities like Cincinnati, St. Louis, Washington, and Pittsburgh. His plan was to schedule seven night games each year, one game with each of the other seven clubs in the league during the hot summer months.

Supporting his contentions, Mr. Crosley said, "The Reds have drawn 70 per cent of their total attendance on opening day, Sundays and holidays, and this has been about the ratio in other smaller major league cities. There is something wrong with a business which finds it necessary to operate on a losing basis on all except 15 days during the season.

"Night baseball not only saved the minors, but has made it possible to double the number of minor leagues in existence four years ago. Hockey, as everyone knows, originated out-of-doors and was played in the daytime, but until adequate lighting systems were provided, hockey was just another game. Times are changing and baseball must keep step with the transformation.

"Night baseball is admittedly an experiment as far as the major leagues are concerned, but viewed entirely in the light of an experiment may be justified by the seriousness of our problem, and deserves a trial.

"If the experiment is unsuccessful, it need not be continued. If the experiment is successful it will go a long way toward solving the problem of week-day attendance in the smaller cities, and will also suggest an avenue to substantiate increased income at other points."

He sold the idea, much to the surprise of the entire sporting world.

The Cubs, St. Louis Cardinals, Boston Braves, and the Reds sponsored the resolution. The Philadelphia Phillies favored the innovation with the reservation that they might change their minds.

The New York and Brooklyn clubs opposed the proposition without reservations, and the Pittsburgh Pirates said "No" with the privilege of changing to an affirmative attitude.

It ultimately was decided that each team could book as many as seven games at home. No club is obligated to accept an invitation to play a night game on the road.

If any club plays more than seven games at home, however, the offending teams will be subject to $15,000 fines and confiscation of the receipts.

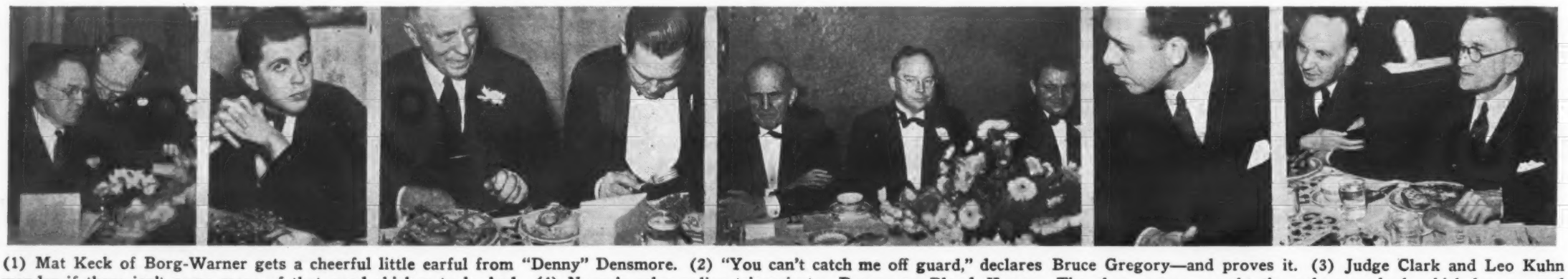
None of the magnates publicly announced plans to install lighting plants, which are said to cost from $25,000 upward.

President Phil K. Wrigley of the Cubs, who attended the meeting and was a leading supporter of the Cincinnati Reds, stated immediately after the meeting that he will not install a lighting plant, but that the Cubs will support the experiment by accepting invitations from teams which do play night games.

Mr. Crosley was also among those who advocated the broadcasting of baseball games as a means of stimulating attendance.

Action! Lights! Camera!

Here's how Norge men arouse spirit and enthusiasm in their meetings: (1) Johnny Knapp (right) outstretches the song leader. (2 & 3) R. E. Densmore injects some fight into the proceedings.



(1) Mat Keck of Borg-Warner gets a cheerful little earful from "Denny" Densmore. (2) "You can't catch me off guard," declares Bruce Gregory—and proves it. (3) Judge Clark and Leo Kuhn wonder if there isn't some more of that good chicken to be had. (4) Norge's sales policy triumvirate—Densmore, Blood, Knapp. The alert camera caught the only sour look which has crossed Denny's pan in the last three years. (5) Bud Gass of the Indianapolis district doesn't quite believe what he has heard. (6) Ed Henley (right) thinks the speaker is absolutely right.

(1) J. R. Blocher gets stern with Cal Zamoiski and Jack Zander of the Baltimore distributorship. (2) "Don't shoot, mister," pleads George Whitney of the Norge home office. (3) Gentlemanly Ludwig Hommel, veteran Pittsburgh distributor. (4) Don't you like this study of Johnny Knapp? The News feels it expresses the famed Knapp personality. (5) Ned Vestal, well-liked executive from Minneapolis, studies the sitcheeayshun with an appraising eye. (6) Gus Schallberg of Borg-Warner wouldn't miss his after-dinner coffee for anything or anybody, but Glenn O'Harra goes right on talking just the same. John Kraft (left) and Fred Lockwood, astute director of public relations for Borg-Warner.

Porcelain Enamel Institute to Extend Educational Plan

COLUMBUS, Ohio—Extension of the educational program which it instituted this year was planned by the Porcelain Enamel Institute at its second quarterly meeting, held here recently.

The industry contact section of the Institute, headed by Earle S. Smith as chairman and R. A. Weaver as vice chairman, presented a plan of education through demonstration and contact with the retail salesmen of porcelain enameled products.

Plans call for department store demonstrations, programs for sales meetings, and presentations to the general public, where possible. The Institute expects to sponsor a porcelain enamel week in key cities where all of the various educational contacts can be carried out simultaneously.

H. D. Chase, chairman of the advertising and sales promotion section, reported that the advertising done thus far in the nature of a test campaign has produced what the committee considered phenomenal results.

The original test campaign was run in the refrigeration field. There was also test copy run in a publication covering the major appliances using porcelain enamel. In both cases hundreds of requests were received by the Institute for the information from all of the four divisions—technical research, market research, industry contact and sales promotion.

After depicting the results obtained from this test campaign, the advertising and sales promotion section presented its program for the coming year, which would include trade paper and direct mail advertising and the distribution of data procured by the technical and market research sections, to all of the major fields through which porcelain enameled products are now marketed.

Neon Signs on Plane Advertise Crosleys

COLUMBUS, Ohio—A tri-motored Ford plane is being used as an illuminated flying signboard by R. C. Bohannan, Inc., central Ohio distributor for Crosley refrigerators and radios.

This plane has a wing spread of 80 ft. and under each wing is a big Crosley neon sign with letters eight feet tall.

Under the body of the plane is a panel with more than 300 electric light bulbs which are operated from a typewriter keyboard so that any letter of the alphabet can be lighted by pressing the proper key.

This makes possible a running electric sign and short messages featuring the merits of Crosley products are thus flashed to the earth.

Mr. Bohannan, an aviation enthusiast and himself a pilot, often serves as co-pilot of the plane, which is chartered from the Brand Aviation Corp. of Columbus.

Walls Joins Research Staff of Inco

NEW YORK CITY — A. J. Wadhams, manager, development and research, International Nickel Company, Inc., has announced the addition of Fred J. Walls to the development and research staff.

Mr. Walls will concentrate on the development of the use in industry of nickel cast irons, including the wear-resistant nickel-chromium cast iron "Ni-Hard," and the high strength cast iron "Ni-Tensyliron."

After specializing in metallurgy at the University of Michigan, Mr. Walls was for 18 years metallurgist at the Wilson Foundry and Machine Co., Pontiac, Mich. His recent connection was with the Eaton Erb Foundry Co. in Detroit.

Appliance Firms Report Increase in Business

WASHINGTON, D. C. — Federal Housing Administration, in a report recently issued, declared that as a result of the Better Housing Program, large gains are being made in sales by companies engaged in the manufacture and distribution of building materials and household equipment.

Among the October gains reported by concerns in these fields were: Delco Appliance Corp., 7.2 per cent; The Celotex Co., 20 per cent; Holland Furnace Co., 35 per cent.

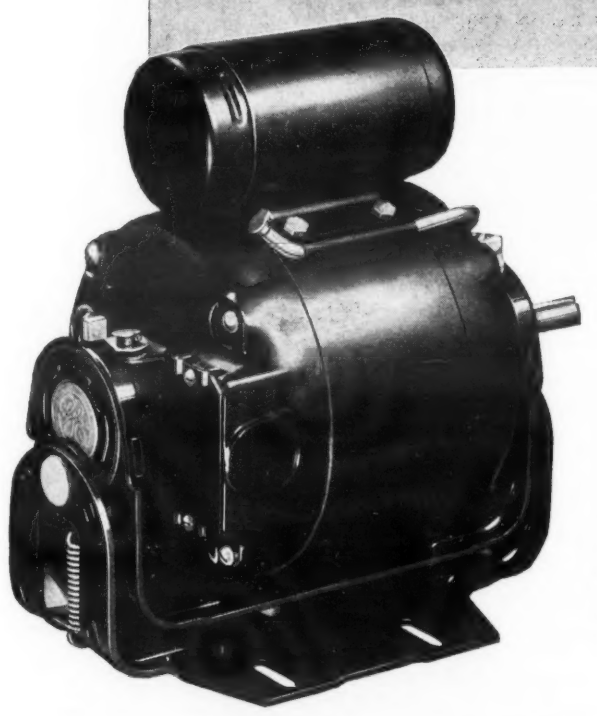
Christmas Trade Boosts Crosley Radio Sales

CINCINNATI—An increase of 37.8 per cent in sales of radio receiving sets for the week ending Dec. 8 over the previous week ending Dec. 1, is reported by the Crosley Radio Corp. This increase is attributed to the lively Christmas holiday trade.

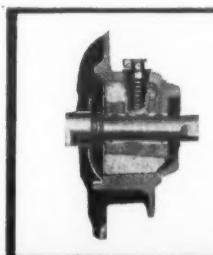
Look Inside!

NEVER BEFORE HAS ONE MOTOR HAD SO MANY FEATURES THAT WILL HELP YOU SELL DOMESTIC REFRIGERATORS

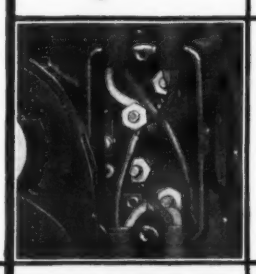
Type KC capacitor-motor with standard base



Type KC capacitor-motor with automatic belt-tightener base

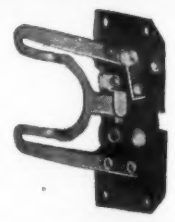


ADVANCED BEARING DESIGN—long bearing life is assured by an unusually large oil supply and a scientifically designed recirculation system. Pure-wool-yarn packing filters the oil and feeds it to the bearings. Oil throwers and returns recirculate the oil. Thus, a constant supply of fresh, clean oil is assured at all times.



SIMPLIFIED CONNECTIONS SPEED ASSEMBLY—leads for line, cold-control, box-light, and light switch are all easily connected to posts provided in the built-in terminal box, without splicing or soldering. This speeds assembly and hence reduces costs.

AUTOMATIC BELT-TIGHTENER BASE—depends on torque instead of springs for its action. Hence, it maintains the correct belt tension to prevent slippage of the belt. With this base, belt tension is automatically and evenly regulated to meet changes in load. The result: greatly reduced friction, which means: (1) longer life of belt, bearings, and seals; (2) quiet operation; and (3) lower operating costs.



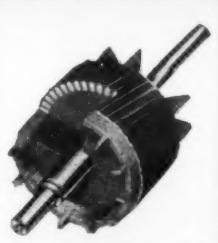
RELIABLE STARTING SWITCH—long-lived—positive-acting—rust-proof—quiet. Built to last the life of the motor. The reliability and long, "care-free" service life of this important unit have been proved by eight years of satisfactory service in the field.

RESILIENT MOUNTING—"CUSHIONED POWER"—the 1935 Type KC capacitor-motor is mounted in large rings of springy, live rubber that are treated with a special G-E compound which makes them impervious to oil. These rubber rings fit snugly into machined recesses around each bearing housing. This construction isolates single-phase torque vibration and hence helps make this motor quiet.

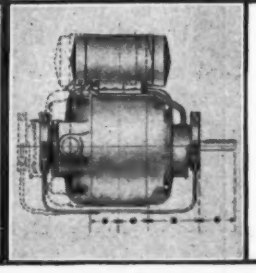
EXCLUSIVE WINDING TREATMENT—will not soften under heat. Bonds the windings together and protects them from moisture, high temperature, and mechanical injury which might shorten motor life. This standard treatment makes the windings suitable for use even in the tropics.

SPRING-STEEL END-PLAY SILENCERS—effectively cushion end bump at both ends, yet permit free movement of the rotor, thus assuring quiet operation without wear or power loss from added friction. Of durable spring-steel construction, these silencers will last the life of the motor.

CYLINDRICAL CAPACITOR—small in size, sheathed in steel—fully protected against injury—and fastened rigidly to the motor. Capacitor connections are entirely separate from line terminals, hence there is no opportunity for incorrect connection. (Cover removed in illustration to show accessibility.)



CAST-ALUMINUM ROTOR—indestructible. Has permanent electrical characteristics and cannot become open-circuited. The entire squirrel cage is a one-piece solid-aluminum pressure casting, made by an exclusive G-E process.



INTERCHANGEABILITY—mounting dimensions for 60 cycle and other commercial frequencies and for direct-current motors are identical. All ⅛-hp. to ¼-hp. resilient-mounted motors, with or without belt-tightener base, will fit the same base drilling. The same motor body will fit either the plain or the belt-tightener resilient base.

*Motor length may vary with the rating, but the mounting dimensions remain unchanged.

You should have complete information about the Type KC "carefree" capacitor-motor — the outstanding refrigerator motor of 1935. The nearest G-E office will be glad to work with you. And, to insure unit responsibility for the electric equipment of your refrigerator, we suggest that you consider G-E cold-control units, and cable, along with the motor. General Electric, Dept. 6A-201, Schenectady, N. Y.

070-73

GENERAL ELECTRIC

ELECTRIC REFRIGERATION NEWS

Registered U. S. Patent Office
Copyright, 1934, by Business News Publishing Co.
Published Every Week by
BUSINESS NEWS PUBLISHING CO.
5229 Cass Ave., Detroit, Mich. Telephone Columbia 4242.
Production Dept., 550 Maccabees Bldg., Columbia 4245.

Subscription Rates—U. S. and Possessions and all countries in the Pan-American Postal Union: $3.00 per year; 2 years for $5.00. Canada: $6.00 per year (due to special tariff). All Other Countries: $5.00 per year (U. S. Money)

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VOL. 13, NO. 16, SERIAL NO. 300, DEC. 19, 1934

Diversification

EVIDENTLY the leaders of the electric refrigeration industry are seeing some handwriting on the wall. And they are interpreting the "Mene, mene, tekel, upharsin" they see in various ways. Many are expanding, setting up larger promotional budgets. A few are retrenching, seeking to recoup their losses. A good many manufacturers have it figured out that the "handwriting on the wall" spells diversification.

Norge, for example, a refrigerator manufacturing operation which started out as an offshoot of Detroit Gear & Machine Co. (manufacturer of automotive parts), is now producing a line of household appliances which include washing machines, oil burners, electric ranges, gas ranges, the Broilator gas cooker, and air conditioners.

General Electric and Westinghouse, of course, have long been making and selling refrigerators, radios, ranges, home laundries, water heaters, etc. G-E is, in addition, pushing the sale of a dishwasher.

Kelvinator has an oil burner on the market, as well as some air-conditioning equipment, and is reported to have other appliances ready and waiting for a favorable market opportunity.

Crosley Believes in Diversification

Crosley has, in addition to its extensive radio line, electric refrigerators, the Icy-Ball absorption refrigerator for farm homes, and the Coolrest, an ingenious device for furnishing conditioned air to sleepers. (Powel Crosley, Jr., also operates WLW, the world's most powerful radio broadcasting station, and the Cincinnati Reds baseball team.)

Fairbanks-Morse, the heavy machinery manufacturing company which has recently entered the appliance field, started right out with radios, refrigerators, and washing machines.

Other examples could be cited. The point is that manufacturers of electric refrigerators have decided not to put all their eggs in one basket.

Distributors Lead the Movement

They don't know how much longer household refrigeration will be "good." They figure it will be "good" for several years yet. Next year, they predict, will be the biggest to date. But when the steadily rising sales curve begins to turn downward, these manufacturers want to be prepared for that contingency by having some other lines doing a steady business.

For the last two or three years far-sighted distributors have been doing the same thing; i. e., acquiring franchises for companion lines. To be sure, many of these jobbers were forced into taking on the distribution of several appliances by the depression, which spotlighted the necessity of reducing overhead and keeping sales staffs busy the year 'round. But all who have done so feel very secure indeed, thank you, about the future of their companies.

In theory, this business of diversification is without doubt eminently praiseworthy. Because the sales peaks of refrigerators, washing machines, and oil burners come at different times of the year, production and employment can be spread over many months, instead of being concentrated in a few. Sales cost is reduced, because the same field staffs can contact distributing outlets, and the same outlets can handle all the various lines manufactured by the company. Advertising of one product redounds to the credit of all. A user of one becomes a potential purchaser of another product with the same nameplate. Executive overhead costs are spread.

Practically, however, getting into these different lines of business presents a number of particularly tough problems. Take the oil burner business, for instance. Here is an industry which was going before electric refrigeration. Its product contributes materially to the comfort and health of the human race, and has a *use value* which is at least comparable with the electric refrigerator. Yet its sales have never even come close to those of refrigerators. The reason, everybody has always said, was that oil burners had not been put into the hands of good specialty selling organizations.

Tough Competition in Heating Field

But now that the best specialty salesmen in the world are to go to work in the oil burner business, some new factors have cropped up which will not make their path smooth. Foremost is the entrance of oil companies, like Standard Oil and Texaco, into the oil burner business. These oil companies will install an oil burner in a home on a five-year contract. The householder's monthly payments include rent or time payments on the burner, his oil, and all service. Because the five-year contract for oil is quite profitable, the oil companies can almost afford to give the burner away—and certainly it is to their interests to keep it well serviced.

Added to this obstacle to the efforts of good specialty salesmen is the tough competition which is currently being offered by gas companies (which rent or sell gas home heating systems as cheaply as the oil companies offer oil burners), and the coal companies which, through subsidized merchandising outlets, are selling coal stokers. The oil burner dealer must compete against the utilities, the oil companies, and local coal concerns—not a pleasant prospect.

Washing Machine Business Good, But - -

Trying to sell washing machines at a profit is no soft job, either, particularly for newcomers to the game. This year was the best the washing machine industry ever had from the standpoint of volume in units (about 1,200,000, which compares favorably with the electric refrigeration total for 1934), but dollar volume was the lowest ever, with the average price per washer about $52.50. Sears Roebuck with its Kenmore washer (made by 1900) is the leading retailer in the washer field, and has done plenty to the price structure in that industry.

Last year a series of local cooperative campaigns promoted by laundry interests were very effective in increasing laundry business. For 1935 a national campaign and still more local campaigns are planned by laundries and manufacturers of commercial laundry equipment. All of which should make the sledding harder for washer salesmen.

Ranges? The combination gas-electric utilities have long impeded the progress of electric ranges. Sales have been distressingly low over a long period of years, and for present volume, at least, the industry has a great excess capacity.

These lines should not be interpreted as being intended to discourage retailers from attempting the sale of other appliances. This paper has for some years been telling the story of companion merchandise and pointing out the profit possibilities in handling several home appliances simultaneously.

Rather, it is simply the intent to show dealers what they are getting into, and to sound the warning that there are obstacles in the path of the salesman of washers or oil burners today which do not confront the electric refrigerator salesman. Smart specialty selling organizations, of course, will figure out how to circumvent these obstacles; and in time should be able to fortify themselves against the vicissitudes which may affect the fortunes of any one product by operating a flourishing business in *several* companion lines of home appliances.

LETTERS

Service Firms' Associations

Master Refrigeration Association, Inc.
112 E. 19th St., New York City
Editor:

It has been the writer's intention for several weeks to ask you if there are any other organizations of a similar nature in existence in the United States. From the information we have been able to gather, Philadelphia has an organization of service men. Chicago seems to have a similar organization, and we faintly hear of some sort of an organization in Los Angeles, but all these are apparently for the direct employees of service firms, and not an organization of the executives, financiers or principals of the firms.

If our authority is correct, both the Philadelphia and Chicago organizations have been effected for the purpose of merchandising by supply concerns, and not having in view the object of upbuilding actual business conditions, improvement of trade, nor a direct benefit for the actual firms.

We would appreciate any information you may care to issue concerning these matters.

E. S. LAPE, Secy-Treas.

Answer: We know of two other organizations of refrigeration service executives. One is in Los Angeles, the other in Chicago.

For information on the Los Angeles operation write L. P. Roth, Refrigeration Service, Inc., 309 Beverly Blvd. For information on the Chicago organization direct an inquiry to George Monjian, Chicago Refrigeration Service Co., 360 E. Grand Ave., Chicago, Ill.

'Free Refrigeration'?

Dry-Zero Corp.
Merchandise Mart, Chicago, Ill.
Editor:

This is the season when electric refrigerator manufacturers, having developed improvements in their merchandise, are preparing to offer their 1935 wares to the public.

Upon these new improvements much stress will be laid. Upon the basis of each manufacturer's claims, many refrigerators will be sold.

The whole industry has a stake in these claims. For every claim now being formulated must stand the test of practical experience in the homes of thousands of buyers. If any such claim signally fails to stand this test, the confidence of a considerable section of the public is shaken, not only in the particular refrigerator involved, but in all electric refrigerators.

These thoughts have been running through my mind since I read a story in your Nov. 7 issue describing a device which, it is claimed, will provide "three months of free refrigeration each year." There is no doubting the manufacturer's genuine enthusiasm for both the device and the slogan. But after careful checking of past investigations, the most favorable calculations indicate a refrigeration loss of only a fraction of that claimed due to service opening of the door.

Quoting the manufacturer, the story states: "When the door of the ordinary refrigerator is opened, cold spills out. Thus a normal housewife loses 30 per cent of her refrigeration (*sic*) every day. The . . . ' which plugs the opening to the food compartment, has room on its shelves for the most frequently used foods—giving . . . owners three months of free refrigeration."

The most liberal calculations I can make indicate a maximum loss of 10 per cent under severe conditions and a practical loss of 3½ to 4½ per cent under normal conditions.

The losses, as I figure them, are based on 40 door openings per day—a high figure. The 10 per cent maximum is reached if the door is allowed to remain open each time long enough to completely change the air inside the refrigerator. The 3½ to 4½ per cent averages are based on the fact that doors seldom remain open long enough to change the air completely, it being realized that much of the space is occupied by food which blocks free circulation.

Of course, there is the further handicap to the device saving 25 per cent—the housewife's occasional desire for something inside the main food chamber.

Let me go over my calculations in detail: Forty door openings per day are used because a recent survey showed this to be a practical peak figure. To be liberal, I assume that the door is open eacn time long enough to permit complete change of air, although smoke tests show only part of the air is changed in a reasonably loaded refrigerator when the door is opened and closed in average use.

To continue my liberal policy, I assume the kitchen temperature is 90° with 60 per cent relative humidity, while the temperature inside the cabinet is 45° with 40 per cent relative humidity.

From engineering tables, we find that 2.94 minus 1.07 or 1.87 B.t.u.'s must be extracted from 1 cu. ft. of air at 90° and 60 per cent relative humidity to lower the air to 45° and 40 per cent relative humidity. To bring down 200 cu. ft. requires removal of 200 times 1.87 B.t.u.'s or 374 B.t.u.'s.

But it also is necessary to freeze the difference in moisture content as frost deposited on the coils. This will require the extraction of something less than 45 B.t.u.'s. (A simple explanation of this calculation is too lengthy to undertake here.)

Adding the 374 B.t.u.'s extracted in lowering the air and the 45 B.t.u.'s extracted in the extra lowering and freezing of the required moisture, we get 419 B.t.u.'s to be removed to carry the refrigerating burden caused by the door openings.

Now, how does this heat entry compare with that from other sources? In a new 5 cu. ft. cabinet—insulated with the stuff used by some manufacturers—the total heat entry from all sources is about 4,200 B.t.u.'s per day, mostly through the cabinet walls but also through warm foods, the freezing of ice, etc.

Therefore, the 419 B.t.u.'s represent less than 10 per cent. And this 10 per cent is obtained by the most liberal calculations that assume abnormal conditions. Similar calculations for normal conditions yield results showing 3½ to 4½ per cent losses, which are borne out by actual experience.

Even a 10 per cent maximum saving under extreme conditions is difficult to accept because it doesn't assume that the housewife ever opens the door into the main food chamber.

Perhaps I overestimate the importance of all this. Frankly, I have hesitated to take up the matter for I don't want to saw the legs off anyone's hobby. But the plain, physical fact is this: the insulation value of the cabinet is the dominant factor in determining heat entry, and any mistaken enthusiasm that beclouds this fact cannot benefit the industry.

The double door device may prove useful. The fault, as I see it, is in the estimate of its value in comparison with that of efficient, durable insulation. The claim does an injustice to the worth of the well-built cabinet, and it seems to me that all manufacturers, including the user of the device in question, should benefit by a correct appraisal of the situation.

HARVEY B. LINDSAY, President.

'Twin' Monitor Tops

Mr. A. M. Sweeney, Sales Mgr.
Specialty Appliance Sales Dept.
General Electric Co.
Nela Park, Cleveland, Ohio.
Dear Mr. Sweeney:

The enclosed clipping from a Honolulu newspaper shows a large-size General Electric refrigerator consisting of two smaller Monitor Top refrigerators joined together. Three years ago at Association Island you had a model of this nature on display, but since then I have heard nothing about it. Are dealers now selling these jobs all over the country? We'd appreciate more information.

Editor.

General Electric Co.
Specialty Appliance Sales Dept.
Nela Park, Cleveland, Ohio
Editor:

The models shown in the photograph from a Honolulu newspaper have had considerable acceptance among many of our distributors. The acceptance has been spotty, however, and not a large number have been sold.

While we originally showed the first combination job at Association Island, as you have stated, we did not actually attempt to sell these combined models actively until this season.

You will note that the clipping showed our latest Monitor Top and was our latest porcelain T-7 cabinet. Since we first showed the model, we have been working to get a more simple means of assembling the two cabinets. This was worked out in the model shown.

I do not believe that there is any worthwhile story in this effort, which would be of general interest to your readers.

A. M. SWEENEY,
Sales Manager.

Appreciative Service Man

58 Sargeant St.
Springfield, Mass.
Editor:

Just can not find words to express my appreciation of your paper and think every man that works around refrigeration should read it. I think it is the best three dollars I ever spent. Hoping to hear from you soon and wishing you a Happy Christmas and a healthy New Year and many more years of editorial help to service men as in the past.

CHESTER MCRAY.

"In the first place, we wish to compliment you on your fine publication, ELECTRIC REFRIGERATION NEWS; and secondly to tell you that we cannot do without it."—Giovanni Emanuel, Via Canova 12, Torino, Italy.

SERVICE

Service Lesson Gives Methods Of Purging and Recharging Household Refrigerators

PRACTICAL methods of purging and recharging the refrigerant of household refrigerators are outlined in lesson No. 16 of the refrigeration service series of the home study course offered by the Refrigeration and Air Conditioning Institute of Chicago. For the help of service men and students who must perform these common service operations, the instructions are given below.

Removal of air from a refrigerating system is called "purging." It is called for when a high head pressure indicates air in the apparatus, also after the connections have been opened up for repairs and after the refrigerant has been discharged and replaced.

It is fortunate that air has a tendency to separate from the refrigerant gas or vapor and, with all the refrigerants commonly used in household compressor systems, the air rises to the top with the refrigerant gas underneath.

This is because refrigerant vapors are heavier than air. Their weights run from a little less than twice that of air, in the case of methyl chloride, to more than four times as heavy with Freon. The air will rise to the highest clear space in the system.

In machines using the lower part of the condenser as a refrigerant storage space, such as the type in Fig. 1, the air will rise to the top of the condenser. In some other types the air will rise to the top of the receiver from where it is released, through a special purge valve or through any other convenient opening.

With arrangements similar to that of Fig. 1, the purging is done through the high side service valve. With this valve turned to the position which closes off the compressor cylinder and discharge valve, it is still connected to the condenser and purging can be done through the gauge port on the valve.

Getting Ready to Purge

The first step is to stop the compressor by turning off the switch or pulling the plug, and letting it remain idle for 10 to 15 minutes so that the air has a good chance to separate from the refrigerant and rise to the top of the space from which it will be removed.

Next we make sure the high side valve is turned all the way out to close off the gauge port, remove the plug or cap from this port, and insert fittings that allow connecting a length of tubing to the gauge port. The tubing usually is copper, ¼ in. in diameter, but some men use heavy rubber tubing for this job.

With refrigerants which do not have a disagreeable odor and which are not otherwise harmful in very small amounts the purging may be done into the open air provided there is plenty of ventilation. We have to use reasonable care because some small quantity of refrigerant is going to be discharged along with the air we want to get rid of.

When purging from a system using sulphur dioxide, the end of the tubing should be in a pail of lye water as shown in Fig. 2. The lye is made by dissolving 1 lb. of lye (or caustic soda) in each gallon of water used, the solution being in a pail made of wood or fibre or else of graniteware with no exposed metal.

It is best to use quite a large deep pail so the liquid remains several inches below the top to avoid the possibility of splashing the lye water outside when the sulphur dioxide combines with the caustic. If you are doing this work where the floors must be protected, you should put a piece of rubberized cloth under the pail. The length of tube you use depends on the point at which you are going to discharge the air and gas.

Releasing the Air

The air is released by just barely cracking the high side service valve for about one minute at a time. This opens the condenser line and compressor discharge valve to the gauge port in which you have the purging line. The idea is to release the air very slowly so you won't disturb the refrigerant vapor and release any more of the refrigerant than absolutely necessary.

With some machines you are also likely to let too much oil out of the compressor if you open the valve too wide or for too long at a time. By releasing the air slowly, cracking and then closing the valve two or three times in the process, you usually can get rid of all the excess air in the one operation. Otherwise, you will not get rid of all the air and probably will get rid of too much refrigerant.

If you are working with a sulphur dioxide machine you can tell when the refrigerant gas starts coming through the purge tube because it will have a rather violent action with the lye water in the pail. With other refrigerants you can notice their odor when the gas comes through following the air.

Checking the Result

Turn the service valve to the position which closes off the gauge port, and if the purge tube has been in water, immediately remove it from the water to avoid drawing liquid up into the tube. Then remove the tube from the service valve and attach the pressure gauge in the regular way, cracking the valve slightly with the connections loose to get any air out of the connection. Read the high side pressure and compare it with the pressure known to be correct for the temperature in which you are working.

If this preliminary pressure check is O.K., run the compressor for 5 to 10 minutes and again check the pressure. If air has remained in the system, this second reading will probably be too high. If the head pressure is now correct you may assume that the purging job has been successful and the refrigerator may be put into service.

If the pressure is too high, indicating air, you can go through the purging operation again. If purging does not make the pressure correct, it indicates that air still is leaking into the apparatus and you will have to locate and repair the leak or leaks before purging will do any permanent good.

Other Methods for Purging

While this method applies in a general way to purging air from any refrigerator, differences in construction sometimes will call for some change in the operations. For example, in the high side float system of Fig. 3, purging according to the exact method just described would remove air from the condenser and top of the compressor but would not remove it from the liquid receiver because of the downward bend in the line from receiver back to condenser. Neither would air be removed from the liquid line, because the float valve would remain closed.

With an arrangement such as in Fig. 3, air is purged from the receiver by making an extra tubing connection as shown from the receiver valve over to the low side valve on

(Continued on Page 10, Column 1)

Methods of Purging Systems

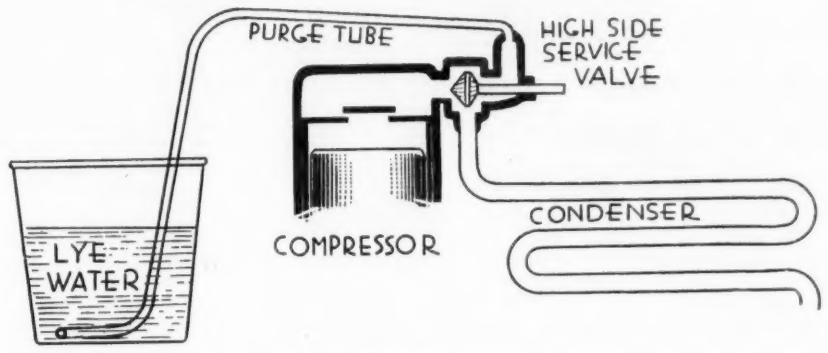

Fig. 2. Method of purging air into lye water, described in this article.

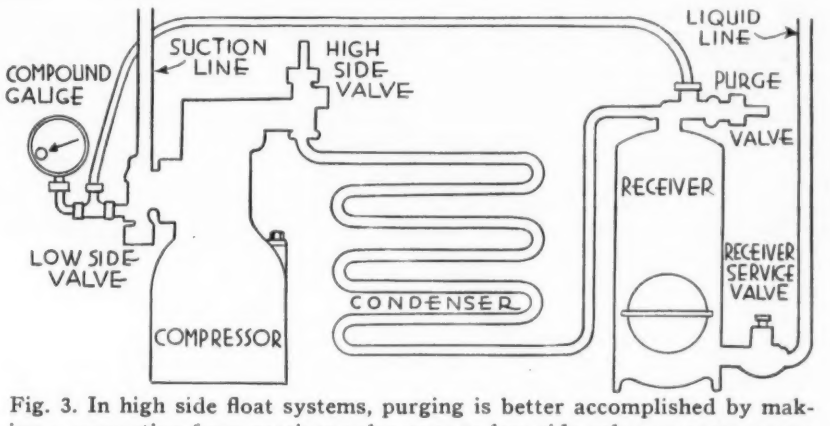

Fig. 3. In high side float systems, purging is better accomplished by making a connection from receiver valve over to low side valve on compressor.

Arrangement of Service Valves

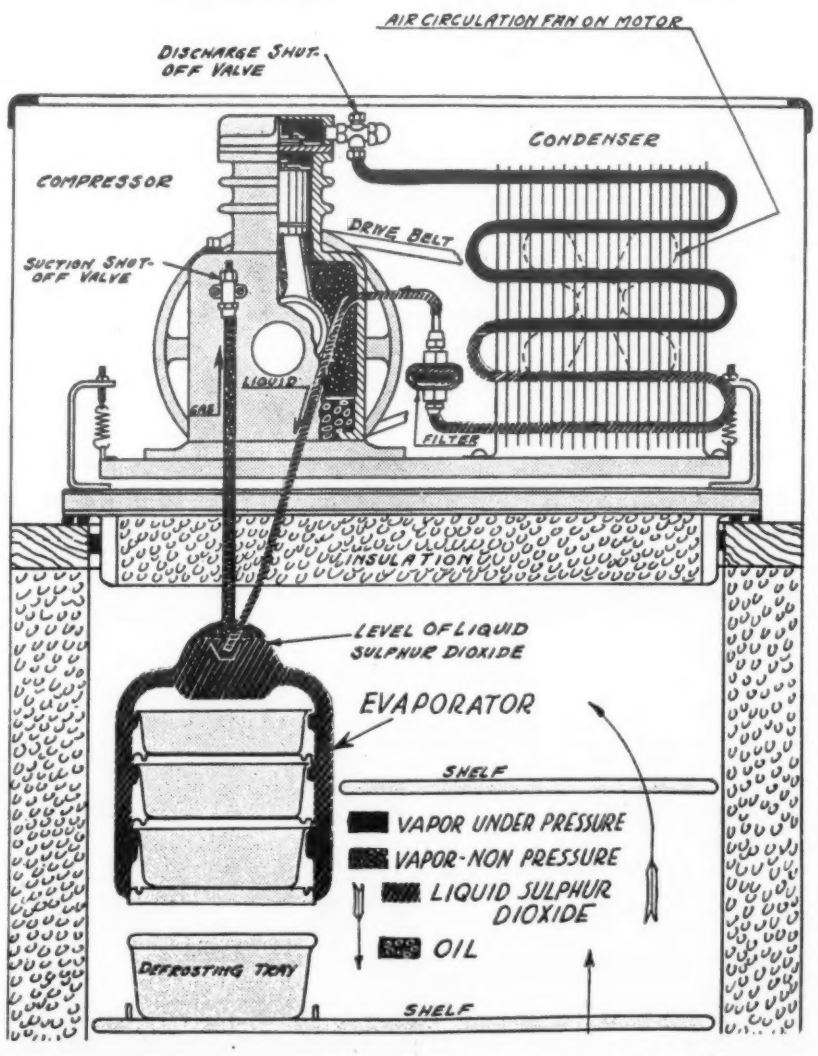

Fig. 1. Typical arrangement of household system service valves (Crosley).

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SERVICE

Methods of Pumping Refrigerants into Liquid Receiver

(Continued from Page 9, Column 5)

the compressor. Instructions for purging follow:

The purge is removed from the high side valve gauge opening, and the opening covered with a dry cloth. With the compound gauge attached as shown, the motor is started and run until you have a 15-in. vacuum on the gauge, then stopped. The receiver service valve will have been previously closed during whatever operations have made it necessary to do the purging. Now, to purge the liquid line open the receiver valve until the compound gauge starts to rise and then close the valve.

Next start the compressor and run it to get a 20-in. vacuum, and to prevent pumping oil, then run the compressor for short periods at a time until the vacuum is 28 in. If oil does come out of the high side valve port, stop the motor and turn the compressor over by hand.

Heating the base of the compressor with a blow torch will help to avoid oil pumping. Also, in moist weather, it is a good idea to heat the whole compressor while drawing the vacuum in order to prevent moisture getting into the system.

Now stop the motor and attach a pressure gauge to the high side service valve. Open the receiver service valve just enough to make the compound gauge show a pressure of 3 lbs., then close it. Test all joints and connections for leaks in the regular way with this low pressure, then open the receiver service valve to get 15 to 20 lbs. pressure and again test for leaks.

If everything appears O.K., open the receiver service valve all the way and start the compressor. Turn the high side and low side service valves to their operating positions, remove the gauges, and close the gauge ports with their plugs or caps.

Special Fittings for Purging

Grunow refrigerators are purged with a special fixture attached to the receiver. The fixture consists of two valves with a compound gauge connected to the space between them. The inner valve opens into the receiver, the outer one to the outside air.

The compressor is run until it is quite warm, then stopped, the fixture is put on, and both the inner and outer valves opened. The cooling fan is held from revolving and the compressor is started and immediately stopped several times, or until no more air comes from the valve.

Then the compressor is run continuously with the outer valve closed until there is a pressure of 3 to 5 lbs. The outer valve is now opened for 5 to 10 seconds to release the air. This is repeated twice at five-minute intervals.

Both inner and outer valves now are closed, the fan is released, the cold control is set for low temperature and with the refrigerator door closed the compressor is run 15 minutes. The inner valve on the fixture is opened enough to get a steady reading on the gauge, then closed.

This is repeated after 15 minutes and if the vacuum is improving, it indicates that the purging was successful and that there are no leaks. The inner valve is finally closed tight and the fixture removed.

Pumping Gas into Receiver

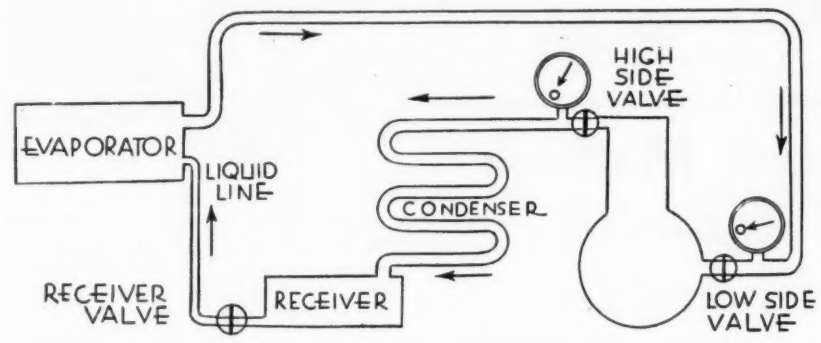

Fig. 4. Pumping refrigerant into the receiver so that the system can be opened for repairs.

Pumping Refrigerant Into Receiver

Whenever we wish to open or remove for repairs the compressor, the evaporator, or the suction line we must get all the refrigerant into the receiver and condenser provided it is to be saved and used again after the repairs are made. The receiver and condenser, or the condenser alone when there is no separate receiver, will usually be large enough to hold the entire charge of refrigerant, but there won't be much space left over. By following the diagram in Fig. 4 you can see how this job is handled.

The compressor is stopped and allowed to remain idle long enough so that the low side has some pressure in those systems working normally with vacuum on the low side. Then attach the compound gauge to the low side service valve by following the rules I gave you a short time back. Next, attach the pressure gauge to the high side service valve, taking care with purging the connections in the regular way. With the gauges attached, close the receiver service valve to shut off the receiver from the liquid line.

The next step is to start the compressor and run it until the compound gauge shows the greatest vacuum you can obtain—usually something like 26 in. This operation pulls the refrigerant in the direction of the arrows in Fig. 4 all the way around the system and forces it into the condenser and receiver.

Now, with the compressor still running, turn the high side service valve to the position that closes off the compressor and leaves the high side gauge connected to the condenser. Shut off the compressor right after closing this valve.

Do not open any connections just yet because there is a vacuum in all parts except the condenser and receiver. This vacuum would draw in air and moisture through any opened connections, and this might cause trouble. To avoid this you "equalize" the pressure by cracking the receiver valve just enough to make the compound gauge show zero or between zero and 1 lb. pressure.

A slight pressure may result in the loss of a little refrigerant gas when the connections are opened, but it will prevent air being drawn in. Finally close the low side service valve to shut off the compressor crankcase. The entire charge of refrigerant, or practically all of it, is now in the receiver and condenser and only a small amount will be lost when other parts are disconnected.

Too Much Refrigerant

Every refrigeration system is designed to operate correctly with a certain charge or certain quantity of refrigerant in the apparatus. Either too much or too little will result in incorrect operation.

Since all refrigerators started out with just the right charge, an excess must mean that some inexperienced or incompetent service man has added more when it was uncalled for.

The receiver may be filled with liquid instead of only partly full, or if the condenser acts also as a receiver, it will be too full of liquid refrigerant and too much of the tubing needed to cool the gas will be taken up with the liquid.

The symptoms of too much refrigerant are somewhat like those for air in the system—the head pressure being too high. Check the head pressure with the machine in operation and compare this pressure with that known to be correct for the room temperature or the temperature in the compressor compartment.

If it reads too high, stop the machine for several hours until everything cools off. If the pressure is still too high, the trouble is air in the parts, but if the pressure is now down to normal the indication is of too much refrigerant.

If the excess liquid reduces the amount of condenser tubing filled with gas, the machine will be overloaded, it will run an excessive length of time, and the overload protection may trip. The condenser will be much hotter than normal near the top, and cooler than normal near the bottom. In any case, the refrigeration may be satisfactory or not, depending on the construction.

Precautions in Discharging

The amount of refrigerant must be reduced to that which is correct, by getting the excess out of the machine. How much you are going to take out depends on how great the overcharge. Even if the discharge is to be very small, you must see that there is plenty of ventilation, and remember that all the common refrigerant gases are heavier than air, which makes them sink to the floor.

It isn't a good idea to discharge any refrigerant into the open air if you can avoid it. If any quantity is to be removed from the system, it is best to collect the refrigerant in an empty service cylinder. Also, the owner of the refrigerator will appreciate your thoughtfulness if you take all foods out of the cabinet when doing this work in a home.

Sulphur dioxide released in any quantity to the open air will kill shrubbery and flowers, also pet animals such as birds and cats. This refrigerant may be released into running water by putting the end of the purging hose down inside a drain, a sink, a laundry tub, or similar place and then letting the water run rapidly while the discharging goes on.

The refrigerant may also be released into lye water in a wood, fibre, or graniteware pail as described for the operation of purging air. If much sulphur dioxide is to be removed, allow 2 lbs. or two ordinary cans of concentrated lye in 1 gal. of water for each pound of refrigerant.

When removing sulphur dioxide or when handling methyl chloride which contains acrolein, many men wear rubber goggles with water chambers or use a gas mask. The methyl chloride combination may be passed through a 5 per cent solution of sodium bisulphite to remove the acrolein.

Discharging an Excess of Refrigerant

Depending on the construction of the apparatus, excess refrigerant may be released through the high side service valve on the compressor or through a special purging valve or cock on the receiver. In any case, the high pressure gauge must be attached to the high side valve in the regular way so that you can observe the drop in pressure as refrigerant is removed.

The gauge connections on the high side service valve, or the receiver purging valve if one is used, may be opened a little bit two or three times in succession until the pressure comes down to the normal value with the apparatus at room temperature.

With the purging hose run to some safe point in the open air, or into running water, or into the lye water, the compressor should be run for a few minutes, then stopped. Gauge connections or the purge valve should then be opened to release some refrigerant.

When working with a dry system—one having an expansion valve—don't let out too much refrigerant at one time because the quantity used in such machines is quite critical. The pressure gauge will tell you when the work has progressed far enough.

If the discharged refrigerant is to be collected instead of being thrown away, attach an empty service cylinder to the high side service valve or to the receiver service valve. Leave the connections loose at the cylinder, open the service valve to purge out the air, then tighten the connections. Now open the valve in the cylinder and open the service valve just enough to release the proper amount of refrigerant. Then close the valve on the cylinder and finally close the service valve.

Removing the Entire Charge of Refrigerant

The usual way of removing all the refrigerant from a refrigerator is as follows:

The compressor is stopped and a length of copper tubing is attached to the gauge port on the high side service valve and the other end of this tubing is connected to an empty refrigerant cylinder.

The connection at the cylinder is left slightly loose, the service valve is cracked to purge the tubing, and then the connections are tightened. The high side valve is turned to the position that shuts off the condenser and leaves the compressor connected to the gauge port as shown in Fig. 5.

(Concluded on Page 12, Column 1)

VITAL POINTS to Consider

before signing your next insulation contract!

NOT one or two but *five* important factors enter into the selection of the *right* insulating material for your refrigerator. (1) Is the insulating efficiency adequate? (2) Can the material be depended upon to stand up in service? (3) Is the insulation reasonable in cost? (4) Is it easy to install? (5) Who makes it?

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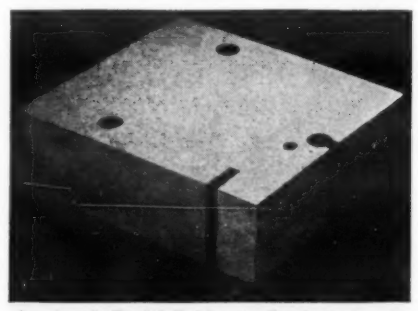

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SERVICE

How to Discharge Refrigerant from & Add It to System

(*Concluded from Page 10, Column 5*)

The valve on the cylinder now is opened and the cylinder is placed in a pail of ice water.

Now attach the compound gauge to the low side service valve, observing the usual care to avoid having air in the connections. and place the valve stem in a midway position to connect the gauge to the compressor while leaving the suction line open, as also shown in Fig. 5. The receiver service valve should be open.

The next step is to start the compressor so that refrigerant will be pumped out of the machine into the cylinder. Let the compressor run until the compound gauge shows a vacuum of 20 in. or more, or let it run until the gauge remains at zero after the compressor has stopped. If the system is a dry one, open the expansion valve by turning the adjusting screw all the way in.

To help get all the refrigerant into the cylinder you can put hot water in the ice cube trays, leave the refrigerator door open, and heat the receiver with hot water on cloths. The reason for this is that the refrigerant will flow only from a place that is warm to one that is cooler.

With refrigerants that are not inflammable, some men use a torch very carefully around the receiver and around the evaporator. This is rather dangerous and care must be used not to get the parts any hotter than allows holding the bare hand on them. Finally, you close the high side service valve, heat the tubing between the high side service valve and the refrigerant cylinder, and close the valve on the cylinder.

When discharging into a service cylinder it is the usual practice to weigh the cylinder before the operation and then again after the discharge so that you can tell how many pounds or ounces of refrigerant have been removed.

If you are going to discharge all the refrigerant, but are not going to save it in a cylinder, the method is just about the same except that the discharge tube is run to some suitable place in the open air, or into running water, or into lye water. A large proportion of the refrigerant usually can be removed with the compressor idle, but the compressor will have to be started to complete the process.

When you are discharging into water, close the high side service valve just before you stop the compressor, then immediately remove the end of the tube from the water to avoid any chance of drawing water back into the valve or into the compressor.

Too Little Refrigerant in System

When you come across a refrigerator in which the compressor operates for too long periods and too often, it generally indicates that the refrigerant supply is too low, even though the box keeps a low temperature.

Examine the amount of frost on the evaporator and on the part of the suction line near the evaporator. If the frost is less than normal amount with the machine in operation, it is a further indication of low refrigerant. When the supply is very low, or almost gone, the refrigeration may be very poor and the compressor may run all the time in an effort to lower the temperature in the cabinet.

With many of the low side float flooded systems, a lack of refrigerant will let the float drop too low and keep the valve open all the time. You can hear a hissing or rushing noise of dry gas by listening near the valve.

A condition such as this may prevent the lubricating oil from being drawn off the top of the liquid in the evaporator and returned to the compressor; with the possibility of burned out bearings and crankshaft seals.

With systems using an expansion valve you can try flushing this valve (opening it wider than normal for a few seconds) while listening. A lack of refrigerant is indicated by only a slight hissing sound, whereas you can hear the liquid pass through when the supply is normal.

When the refrigerant is too low, the head pressure may be below normal with the machine running when the supply is very low, and the pressure may drop considerably within 10 or 15 minutes after the compressor stops. The suction pressure or back pressure may be higher than normal while the machine is idle, may then drop more quickly than it should when the compressor starts, and then may be lower than normal with the apparatus running.

A few systems are equipped with a test cock or valve on the receiver at the height of the normal liquid level. If only dry gas comes out when you open this valve, the level is too low. The correct condition is when both vapor and liquid appear intermittently.

In any case of low refrigerant, the first thing to do is locate the cause—which is almost certainly a leak. Use the methods you regularly employ for locating leaks and be sure to do the work thoroughly.

It won't do any permanent good to assume there is no leak, and simply add more refrigerant. That method insures that another service complaint will be registered by the user within a short time. Only after a leak has been located and properly repaired, is it time to add enough refrigerant to bring the supply back to normal.

How to Add Refrigerant

When you have decided there is not enough refrigerant in the system, add whatever is needed to make up the correct amount as follows:

Be sure the low side service valve is backed out to close the gauge port, then place a "T" fitting in the port and put your compound gauge in one leg of the fitting. Attach a length of copper tubing to the other leg and connect the far end of this tubing to a cylinder of refrigerant. Before finally tightening the connections, crack the service valve to purge the air in the regular way.

The refrigerant cylinder should be warmed by putting it in a pail of warm water or by using hot cloths. Don't use a torch for this purpose. Place the cylinder upright, with its valve at the top, so that you will admit refrigerant vapor and not liquid to the compressor.

Before finishing this operation you are going to make a pressure measurement on the high side, so before going further you may as well attach your pressure gauge to the high side service valve according to the instructions for attaching gauges.

Now turn the low side valve inward so that you have an opening from the compressor crankcase to the compound gauge and also to the tubing which leads to the cylinder of fresh refrigerant. Start the compressor. Then watch the compound gauge and open the valve on the service cylinder a little ways.

Whenever the compound gauge shows a vacuum, open the cylinder valve, and whenever this gauge shows a pressure, close the cylinder valve. Aim to keep the compound gauge steady around zero. Don't ever admit the refrigerant rapidly enough to make the compressor knock.

Continue to admit refrigerant vapor in this manner until the pressure gauge shows a reading that corresponds with the room temperature. By listening at the float valve, or at the expansion valve while flushing it, you can tell when liquid comes through after having a little experience. Also, when enough refrigerant has been added, frost will commence to extend out along the suction line away from the evaporator.

Next close the valve on the service cylinder securely, heat the connecting tube to drive the remaining gas into the compressor, turn the low side service valve to its running position so the gauge port is closed off, stop the compressor and remove the service cylinder and fittings.

Run the machine about 15 minutes and watch the pressure on the high side. If the pressure is a little too high, indicating that you have added too much refrigerant, you can crack the connections at the pressure gauge and release enough to get a correct reading. Then remove the pressure gauge and examine every connection for possible leaks.

Many men make it a practice to weigh the service cylinder before and after adding refrigerant so they can tell just how much has been put in. Inasmuch as the original loss of refrigerant may have resulted in a loss of oil at the same time, it is a good idea to check up on the oil supply after several hours. The matter of oil checking and other operations involving lubrication will be taken up in a later Work Sheet.

Other Methods of Adding Refrigerant

Leaks must always be located before refrigerant is added. When refrigerant is to be added immediately following the vacuum method of locating leaks, you can have the service cylinder connected to the low side service valve, as in the operation just described. With the vacuum still in the machine, you then open the valve on the cylinder to purge out any air from the compressor head. Then tighten the connections.

Now turn the high side service valve almost to its running position and close the valve on the service cylinder. The refrigerant that has entered from the cylinder will have relieved the vacuum and there will be some pressure on the low side, as shown by the compound gauge. The receiver service valve will have been closed, and now you can open it slowly to let the refrigerant into the evaporator.

When working with a refrigerator which operates with a vacuum on both the low and high sides at all times, with Carrene as the refrigerant, the procedure for adding to the supply is somewhat different from the methods just described.

Discharging All the Refrigerant

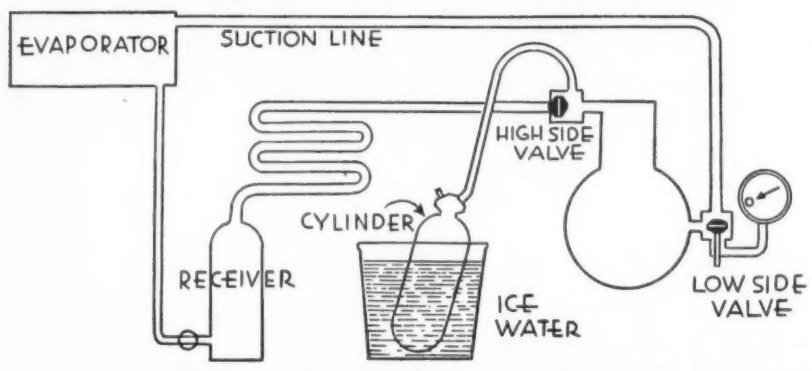

Fig. 5. Transferring all refrigerant from a system into a service cylinder.

Method of Charging System

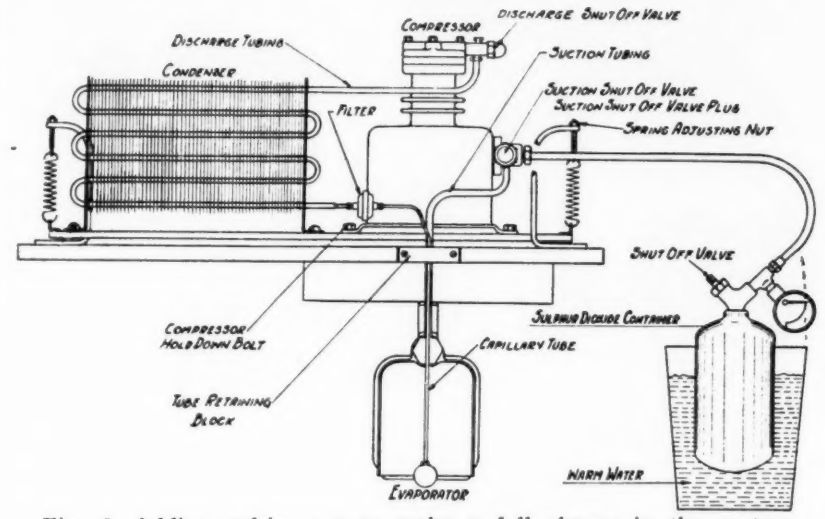

Fig. 6. Adding refrigerant to make a full charge in the system.

The first step is to see that the high side vacuum measures several inches. The machine then is run for five hours or more until the compressor is hot, after which the suction line connection on the base of the compressor is loosened.

Now wait about 10 minutes for the air which enters through the loosened connection to force the refrigerant liquid from the evaporator into the receiver, or float chamber of this machine.

The float chamber or receiver has a special purging valve on one side. The core is removed from this valve and Carrene is poured in through the opening using a funnel soldered to a piece of copper tubing 3/16 in. in diameter.

There is a gauze screen inside the opening and you must take care not to damage it. The refrigerant is added until it comes up to the valve opening and overflows. The suction line connection is now tightened.

Next start the compressor and immediately stop it again several times, until no more air comes out of the purging valve. After that you let the compressor run continuously. There is now a considerable quantity of air in the apparatus, and this must be eliminated by purging in the regular way for this type of machine.

We have been adding refrigerant to a system that is not completely empty and have put in just enough to restore the correct charge. This operation is not the same as charging a system with refrigerant. When we simply add a "make-up charge" we don't know exactly how much refrigerant will be required.

In putting a full charge into a machine that has none to begin with, we know what that particular make and type should take.

G-E Talking Kitchen Available to Dealers

CLEVELAND—A new and more ingenious version of the General Electric "Talking Kitchen" shown for two years at the Century of Progress, is now available in the form of traveling equipment which may be used in connection with electrical shows, fairs, cooking schools, department store activities and utility shows.

It has already been shown at the following local activities: *News* Cooking School in Cleveland; Toledo Home Modernization Show; Caswell, Inc., new retail store opening in Jackson, Mich.; The May Co., Cleveland department store.

Smyth Plumbing Is G-E Dealer in Spokane

SPOKANE—James Smyth Plumbing & Heating Co. is the new Spokane dealer in the territory of General Electric Supply Corp., Portland, Ore. The new outlet merchandises all of the G-E home appliances, including oil furnaces, and is the G-E commercial refrigerator distributor for the Spokane territory.

Hardware Firm to Sell G-E Appliances

SIOUX CITY, Iowa—Joe Thayer, manager of the Thayer Hardware Co., 2012 South St. Aubin St., has announced that his organization has been appointed dealer for General Electric household appliances.

EH&FA to Finance Well Water Pumps

CHATTANOOGA, Tenn. — Approval of contracts for the financing of deep and shallow well electric pumps produced by five manufacturers has been announced for the Electric Home & Farm Authority today by George D. Munger, commercial manager.

Equipment of a total of 12 manufacturers has been approved for EH&FA financing, Mr. Munger said, the remaining contracts now being in the hands of the manufacturers for signing.

Manufacturers whose financing contracts have been received are as follows:

Everite Pump and Mfg. Co., Lancaster, Pa.; Gould Pumps, Inc., Seneca Falls, N. Y.; The McKays Co., St. Paul, Minn.; Monarch Engineering Co., Dayton, Ohio; A. D. Cook, Inc., Lawrenceburg, Ind.

Retail prices for the deep well pumps range from $90 to $140 and prices for the shallow well pumps have a range of $52 to $68. These prices include a combined pressure and storage tank in addition to the pump equipment.

EH&FA financing will not be available for well digging, Mr. Munger said.

Approved pump equipment will be financed throughout the territory where EH&FA is now financing customer purchases of electric refrigerators, ranges and water heaters. This territory includes the part of Georgia served by the Georgia Power Co., the part of Tennessee served by the Tennessee Electric Power Co., and the part of Alabama served by the Alabama Power Co.

The territory also includes the following independent utilities; Alcoa, Etowah, Lebanon and Franklin in Tennessee; Barnesville and Cartersville in Georgia; Athens in Alabama; Alcorn County, Amory, Tupelo in Mississippi, and the following counties in northeast Mississippi which are served directly by TVA power: Benton, Tippah, Tishomingo, Prentiss, Pontotoc, Lee Itawamba, Union and the northern half of Monroe.

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Today, *22 out of 28* manufacturers of commercial units and *9 out of 30* manufacturers of household units use ARTIC as the refrigerant for all or part of their line, because it provides efficient, dependable refrigeration.

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Nema Files Brief on Swiss Tariff

WASHINGTON, D. C.—The Foreign Trade Committee of the Refrigeration Division of National Electrical Manufacturers Association has filed a brief with the State Department of the U. S. Government seeking a reduction in the Swiss tariff on electric refrigerators in connection with the State Department's forthcoming negotiations for a reciprocal trade agreement with Switzerland.

The brief was filed by Haldeman Finnie, manager of the Refrigeration Division of Nema, upon recommendation of the Nema Foreign Trade Committee.

Text of the brief submitted to the State Department is as follows:

On behalf of the electric refrigeration industry, I am presenting the following information and recommendations regarding the proposed trade agreement with Switzerland. This organization includes manufacturers, who, it is believed, produce 85 per cent to 90 per cent of the total volume of the industry.

The Potential Market

Switzerland is an exceptionally good market for electric refrigerators of American make by virtue of its high living standards and the wide-spread use of electric power. The population of 4,066,400 (1930) indicates a potential market of at least 500,000 electric refrigerators. It is estimated that not more than 20,000 units are in use today, or four per cent of the potential market. The American market is believed to be 28 per cent saturated. To reach the same state of saturation in Switzerland would mean the sale of 120,000 units which would provide *direct* employment, it is estimated, for 2,400 men for one year. We believe that this result could be obtained within a very few years, if the present obstacles to American trade were removed.

Present Obstacles

American manufacturers find it difficult to sell their products in Switzerland under present conditions for the following reasons:

1. High Duties. Effective June 1, 1932, the Swiss tariff on refrigerators was sharply increased. (From 35 to 200 francs per 100 kilos on small units and from 30 to 150 francs on larger sizes). The following typical examples show that the present schedules are equivalent to ad valorem rates of 85 per cent to 100 per cent on household units and 65 per cent to 80 per cent on commercial units, while a restoration of the old schedules would be equivalent to ad valorem rates of 17 per cent to 20 per cent on household and 13 per cent to 14 per cent on commercial.

2. Import Quotas. Under the recently established quota system, imports of electric refrigerators are now limited to 50 per cent by weight of the imports in 1931. The quotas are not based on the country of origin or the make of the refrigerator, however, but on the identity of the importer. Under this ruling one important American manufacturer who, for valid reasons, has changed his Swiss agency since 1931 fears that he will be completely barred from the Swiss market in future because his present agent was not importing refrigerators in 1931 and hence will be unable to get an import permit. Another large manufacturer who has entered the Swiss market within the last three years finds his investment there threatened with complete destruction because he imported no units in 1931.

In addition to reducing American exports directly, the quota system will further reduce them indirectly. Importing firms with a greatly reduced volume of business will find it necessary to raise unit prices to cover their overhead expenses. Such increases, added to prices already extremely high as a result of the present tariff, will further restrict the market for American refrigerators.

Recommendations

1. Lower Duties. We recommend that the present rates of duty be reduced to those in effect prior to June, 1932, which we believe will sufficiently protect local manufacturing operations which are economically sound.

2. Elimination of Quotas. a. We strongly recommend the elimination of all quotas.

b. If this should be impossible, we recommend, as an unsatisfactory alternative only, that a time limit be set for the expiration of the quota and that in the meantime the quota system be so administered as not to penalize any American manufacturer who has changed Swiss agents since 1931 or who has entered the market for the first time since that year.

3. Future Discrimination. We further recommend that any reductions in duties on electric refrigerators which may subsequently be granted by Switzerland to another country, shall automatically be granted also to the United States.

If it will be of assistance to the State Department in its negotiations with the Swiss Government, we suggest that consideration be given to the reclassification of electric refrigerators under the Tariff Act of 1930 by transferring them from Paragraph 353 to Paragraph 372.

Atwater Kent Cabinet

Racks on the inside of the door provide handy food storage space in the new refrigerator models.

Atwater Kent Starts Shipping Units

(*Concluded from Page 1, Column 3*)

ates with a slight lift or easy pressure. All but the smallest models have an automatic interior electric light.

The 12-point temperature control has a manually-operated defrosting switch. Defrosting may also be accomplished by stopping the machine with the master switch button.

Each position on the temperature switch dial represents approximately 1° F. change in temperature.

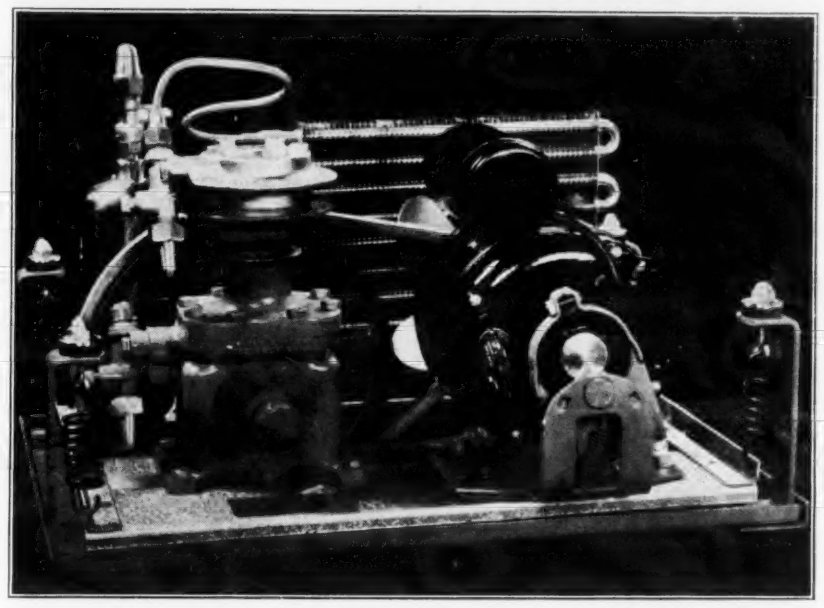
In case of overload, the unit is automatically protected against damage and the master switch button on the control will snap forward showing a red shank. If the button continues to snap forward, it is a sign that serious trouble is at hand, and that a call for a service man is necessary.

Operation of the refrigerating system is controlled by a thermostatic expansion valve.

Key specifications on the Atwater Kent refrigerators are as follows:

Model No.	R334	R615	R256	R547
Overall Exterior Dimensions				
Height	53⅛	55⅞	58½	59⅞
Width	23⅞	26¾	29¾	32
Depth	21½	23⅞	24½	24½
Storage Capacity				
Gross food storage (cu. ft.)	4.75	5.64	6.69	7.67
Net food storage (cu. ft.)	4.31	5.16	6.15	7.13
Total shelf area (cu. ft.)	8.5	11.03	13.04	14.31
Ice Cube Trays				
No. of trays	2	3	3	3
No. of cubes	63	84	112	112
Weight of cubes (lbs.)	4.5	6	8	8
Thickness of insulation (in.)	2	2½	3	3

Atwater Kent Condensing Unit



This single-cylinder condensing unit with reciprocating compressor will furnish refrigeration for all Atwater Kent models.

Utility Refrigeration Co. Opens New Office

NEW YORK CITY—Utility Refrigeration Co., Inc., refrigerating engineering and installation firm here, has just opened enlarged offices and shops on the ground floor at 102 Fifth Ave., according to E. S. Lape, sales manager. R. A. Engle is president and J. G. Riordan, vice president.

Pollock Resigns from Peirce-Phelps

PHILADELPHIA—Julian G. Pollock has announced his resignation as sales promotion and advertising manager of Peirce-Phelps, Inc., Philadelphia refrigeration and radio distributor, to become president of Dittman-Pollock, Inc., advertising agency.

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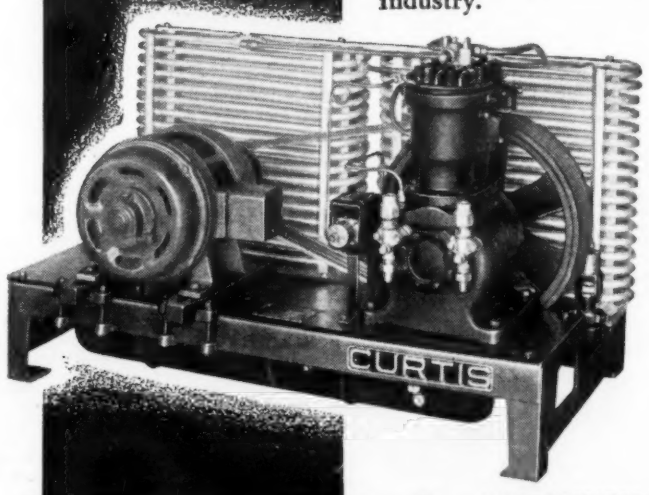

• Some desirable territories are still open for reliable distributors.

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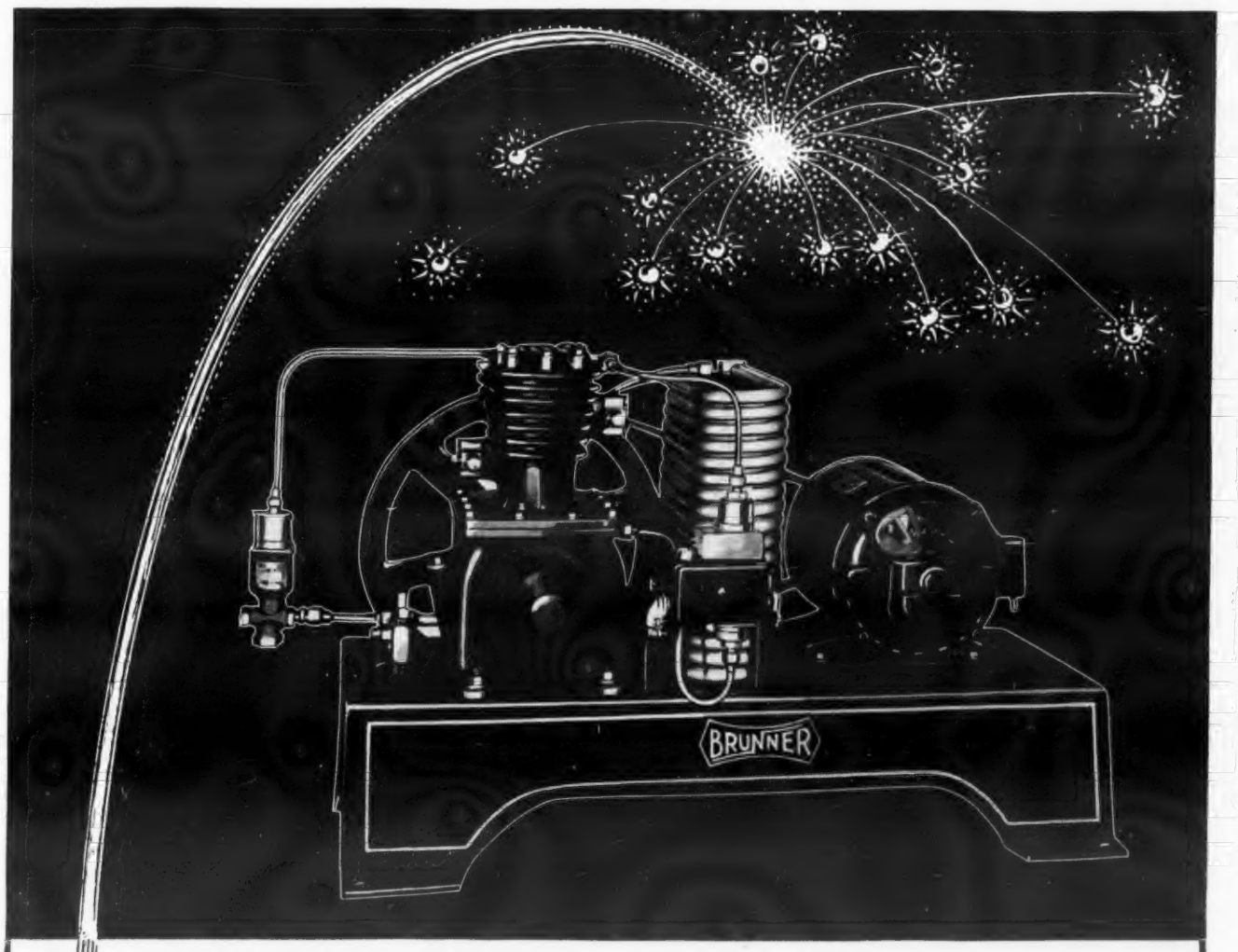

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Brunner

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PATENTS

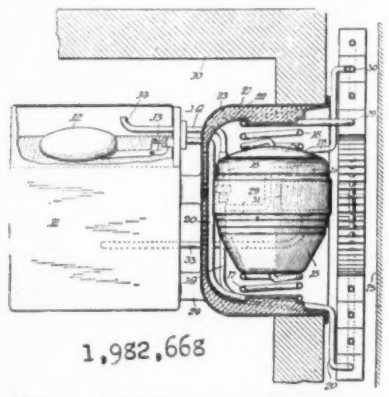
Issued Dec. 4, 1934

1,982,639. AIR FILTER.. Charles Christofferson, Duluth, Minn., assignor to Universal Air Filter Corp., Duluth, Minn., a corporation of Minnesota. Application June 14, 1933. Serial No. 675,685. 6 Claims. (Cl. 183—62.)

4. In an air filtering apparatus, the combination with a casing having end compartments and an intermediate chamber open both front and back for the passage of air therethrough, said end compartments being separated from the chamber by partitions; of a guideway in said chamber communicating at its ends with said compartments through openings in said partitions, said guideways being defined and constituted by front and back screen sections, one of said sections being displaceable and the other permanently fixed; an air filter medium extending through said guideway; and means for advancing the filter medium through the guideway.

1,982,668. REFRIGERATING APPARATUS. Rasmus H. Hvid, Chicago, Ill., assignor to Frigidaire Corp., Dayton, Ohio, a corporation of Delaware. Application Feb. 27, 1931. Serial No. 518,709. Renewed Nov. 1, 1933. 11 Claims. (Cl. 62—115.)

1. In refrigerating apparatus, the combination of a constantly running



1,982,668

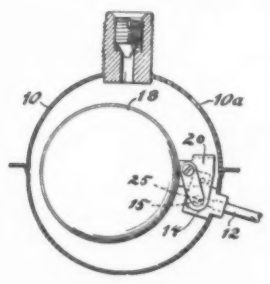
motor, a compressor, a condenser and an evaporator, and means controlled by the temperature condition of the evaporator for unloading and reloading the motor whereby to maintain a uniform temperature.

1,982,672. PROCESS FOR THE SIMULTANEOUS GENERATION OF COLDNESS AND STEAM UNDER PRESSURE. Ernst Koenemann, Halensee, near Berlin, Germany, assignor to Gesellschaft fur Drucktransformatoren (Koenemann-Transformatoren) G. m. b. H., Berlin, Germany, a corporation of Germany. Application April 15, 1931. Serial No. 530,418. In Germany April 24, 1930. 21 Claims. (Cl. 62—179.)

1. The method of generating coldness and steam under pressure consisting in subjecting molten zinc chloride ammoniacate to a high temperature to decompose it under pressure into gasiform ammonia and a second zinc chloride ammoniacate with a lower content of ammonia, usefully extracting sensible heat from the gasiform ammonia, condensing said ammonia by extracting latent heat, evaporating it under reduced pressure so as to produce coldness, usefully extracting sensible heat from the second zinc chloride ammoniacate, introducing the evaporated ammonia into the second zinc chloride ammoniacate to re-form said first zinc chloride ammoniacate, usefully extracting the heat developed by the recombination to generate steam under pressure, and returning said reformed zinc chloride ammoniacate for re-decomposition.

1,982,705. FLOAT VALVE. Frederic L. Tarleton, Greenville, Mich., assignor to Gibson Electric Refrigerator Corp., Greenville, Mich., a corporation of Michigan. Application May 20, 1933. Serial No. 671,983. 2 Claims. (Cl. 137—103.)

1. In a float valve construction, a supporting member having a valve orifice



1,982,705

opening in one face thereof, a float, means including an arm pivotally connecting the float to the support, another relatively thin and flat arm connectd to the first and movable in response to movement thereof across and substantially parallel to the orificed face of the supporting member, a valve member supported by said last mentioned arm and having a head portion between the arm and support and engaging the latter, and a reduced stem portion slidably projecting through and from the arm, whereby the valve is movable across the orificed surface of the support to and from a position in which it blocks the orifice, a leaf spring carried by said second mentioned arm and bearing against the stem portion of the valve to urge the head portion toward the orificed surface of the support, and a pivot pin pivotally securing both said arms to the support and projecting beside the spring to prevent undesired lateral movement thereof.

1. 982,789. METHOD OF REFRIGERATION AND APPARATUS THEREFOR. Walter Gordon Clark, Los Angeles, Calif., assignor to Air Ice Research & Development Corp., Los Angeles, Calif., a corporation of Delaware. Application Feb. 8, 1932. Serial No. 591,524. 25 Claims. (Cl. 62—91.5.)

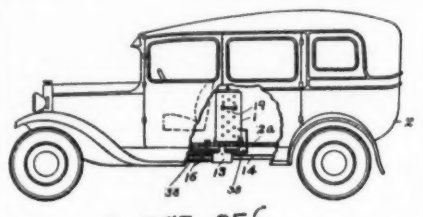
13. A refrigeration unit, comprising a storage container for gasifiable refrigerants, a body of freezable liquid substantially enclosing said container, gas expansion conduits, conduit means connecting said container with said expansion conduits, a pressure control valve in said conduit means, and gas discharge means from said expansion conduits.

1,982,791. REFRIGERATION APPARATUS. Walter Gordon Clark, Los Angeles, Calif., assignor to Air Ice Research & Development Corp., Los Angeles, Calif., a corporation of Delaware. Original application Feb. 8, 1932. Serial No. 591,524. Divided and this application Oct. 3, 1932. Serial No. 635,916. 7 Claims. (Cl. 62—1.)

4. A storage device for gasifiable refrigerants, comprising a container provided with an inlet, a cap member for said inlet, and a liquefiable holding means for releasably holding said cap member on said inlet whereby the maximum pressure of gasified refrigerant in said container is controlled by said holding means.

1,983,056. REFRIGERATOR. Henry F. Teichmann, Washington, Pa. Application September 2, 1933. Serial No. 687,966. 10 Claims. (Cl. 62—117.)

1. A portable refrigerator having capacity for service in an automobile and additionally having capacity for a secondary condition of service,, said refrigerator comprising a box including an insulated storage chamber, heat-energized refrigerating apparatus adapted to chill said chamber, said refrigerating apparatus including a generator adapted to be heated for effecting refrigerating operation of said apparatus, means for removably establishing, when said refrigerator is installed in an automobile,



1,983,056

thermal communication between said generator and the exhaust gases of the automobile, and means for rendering said generator adaptable to an alternative source of heat, to admit of said double capacity.

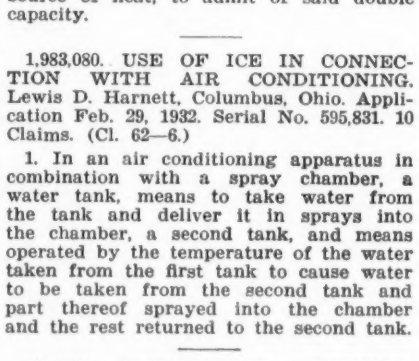
1,983,080. USE OF ICE IN CONNECTION WITH AIR CONDITIONING. Lewis D. Harnett, Columbus, Ohio. Application Feb. 29, 1932. Serial No. 595,831. 10 Claims. (Cl. 62—6.)

1. In an air conditioning apparatus in combination with a spray chamber, a water tank, means to take water from the tank and deliver it in sprays into the chamber, a second tank, and means operated by the temperature of the water taken from the first tank to cause water to be taken from the second tank and part thereof sprayed into the chamber and the rest returned to the second tank.

1,983,120. HUMIDIFYING RADIATOR. Julius L. Cable, Boston, Mass., assignor, by mesne assignments, to American Moistening Company, Providence, R. I., a corporation of Maine. Application Dec. 26, 1930. Serial No. 504,698. 18 Claims. (Cl. 257—179.)

1. A humidifying radiator comprising a horizontally disposed heating section composed of two members arranged side by side and connected at their adjacent ends, each of said members having its top surface arranged to decline from one end to the other, with each declining in the opposite direction to the other, the lower end of the top surface of one member being disposed at the level of the higher end of the other and connected thereto to permit gravity flow from one to the other.

1,983,260. COMBINED MOTOR AND COMPRESSOR. Carlo Zorzi, Milan, Italy. Application April 11, 1930. Serial No. 443,-



1,933,260

604. In Italy April 15, 1929. 13 Claims. (Cl. 230—139.)

1. In a motor-compressor unit a compressor and an electric motor having a stator and a rotor, and a gas tight casing enclosing the compressor and the motor rotor, the portion of said casing enclosing said rotor including an annulus of laminations upon which said stator is supported.

1,983,261. PUMP OR COMPRESSOR. Carlo Zorzi, Milan, Italy. Application March 7, 1931. Serial No. 520,936. 5 Claims. (Cl. 103—161.)

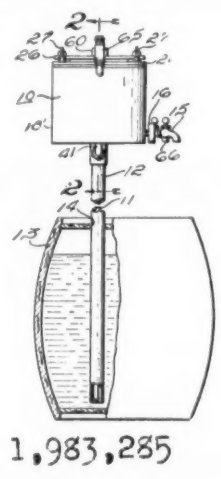
1. In a pump or compressor, the combination of a support, a trunnion having a passage therethrough and secured to said support, an eccentric carried by said trunnion, a cylinder carried by said eccentric, a free piston in said cylinder, a hollow sleeve adapted to reciprocate in said piston and forming therewith a pressure chamber at sub-normal speeds and adapted to reciprocate the piston in the cylinder at normal speed, and a rotating member secured to said sleeve and adapted to rotate the aforesaid cylinder, piston and sleeve about said eccentric.

1,983,262. COMBINED MOTOR AND COMPRESSOR. Carlo Zorzi, Milan, Italy. Application, March 7, 1931. Serial No. 520,937. 12 Claims. (Cl. 103—118.)

1. In a motor-compressor unit, an electric motor having a rotor, a fixed shaft and a flywheel revolvably mounted thereon, said flywheel having an integral extended portion forming a support for said motor rotor, a casing enclosing said parts, and a stator outside of said casing for driving said rotor.

1,983,285. COOLING DEVICE. George A. Gloor, Dearborn, and Marcel Banke, Detroit, Mich. Application Oct. 6, 1933. Serial No. 693,229. 10 Claims. (Cl. 225—18.)

1. In beverage cooling, aerating, and dispensing apparatus, the combination of a source of supply including a closed container, a closed refrigerant chamber, a conduit communicating between the interiors of said chamber and said container, a closed dispensing chamber arranged adjacent said refrigerant cham-



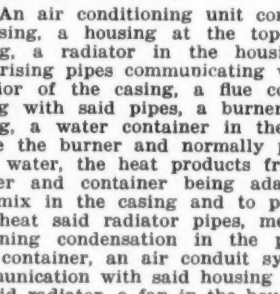
1,983,285

ber so as to be cooled thereby, a conduit communicating between the interiors of said container and said dispensing chamber, and solid carbon dioxide disposed in said refrigerant chamber and adapted to generate gaseous carbon dioxide, whereby the gas carbon dioxide passes through said first named conduit to said container to aerate the beverage therein and to cause flow of such beverage from said container to said dispensing chamber where the beverage is cooled by the solid carbon dioxide in said refrigerant chamber.

1,983,294. AIR CONDITIONING UNIT. Philip Huttenmiller, Cincinnati, Ohio. Application April 19, 1932. Serial No. 606,161. 3 Claims. (Cl. 126—116.)

1. An air conditioning unit comprising a casing, a housing at the top of the casing, a radiator in the housing and comprising pipes communicating with the interior of the casing, a flue communicating with said pipes, a burner in the casing, a water container in the casing above the burner and normally provided with water, the heat products from said burner and container being adapted to intermix in the casing and to pass into and heat said radiator pipes, means for returning condensation in the pipes to said container, an air conduit system in communication with said housing in front of said radiator, a fan in the housing behind the radiator, means for rotating the fan, the fan being adapted to induce air into the housing behind the radiator and to move the air through said radiator exteriorly of the pipes thereof and subsequently through said conduit system, filter cloths suspended in the housing behind the fan in the path of the indrawn air, a water supply line adapted to pass water through said cloths, a tank beneath said cloths for receiving water drainage therefrom, a line connecting the interior of said tank with the interior of the water container in said casing and adapted to maintain an equal water level in said tank, a valve in said water supply line and controlled by said float for replenishing and shutting off the water supply to said tank, and a pilot and thermostatic control means associated with said heating element.

1,983,295. ABSORBER FOR REFRIGERATION SYSTEMS. Peter Kohler, Stockholm, Sweden, assignor, by mesne assignments, to Electrolux Servel Corp., New York, N. Y., a corporation of Dela-



1,933,295

ware. Application Nov. 11, 1930. Serial No. 494,827. In Germany Jan. 24, 1930. 14 Claims. (Cl. 261—104.)

1. An absorber comprising a tube within a tube, means at the ends of said tubes forming a closed chamber therebetween, inlet and outlet connections for circulation of both liquid and gas through said chamber, and cooling coils secured to the exterior of the outer tube and to the interior of the inner tube.

1,983,301. COOLING APPARATUS. William M. Morgan, Tulsa, Okla., assignor to The Carbondale Machine Co., Carbondale, Pa., a corporation of Pennsylvania. Application Sept. 16, 1931. Serial No. 563,027. 8 Claims. (Cl. 62—114.)

1. An apparatus for chilling liquid to separate solids therefrom, including a plurality of straight pipe sections, headers connecting said sections in series to form a zig-zag conduit having a liquid inlet in the uppermost pipe section, and a liquid outlet in the lowermost pipe section, means for scraping solids from the interior of said pipe sections, outer pipe sections encircling said first mentioned pipe sections and forming jackets for said straight pipe sections, headers connecting said outer pipes in series, an accumulator above said pipes and having a feed conduit leading to the jacket of the lowermost pipe section near the liquid outlet end thereof for delivering volatile liquid refrigerant and maintaining said jackets flooded with said liquid refrigerant, and a gas return conduit leading from the jacket of the top pipe section to said accumulator.

BUYER'S GUIDE

MANUFACTURERS SPECIALIZING IN SERVICE TO THE REFRIGERATION INDUSTRY

SPECIAL ADVERTISING RATE (this column only)—$12.00 per space.

Payment is required monthly in advance to obtain this special low rate.

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★ *To Our Friends in the Industry* ★

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from the makers of

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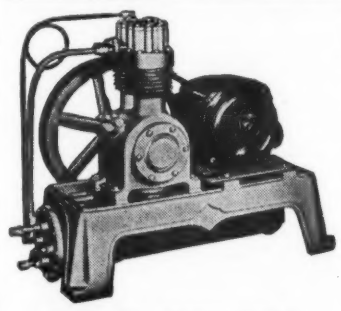
TRENTON AUTO RADIATOR WORKS

Main Offices and Factory, TRENTON, NEW JERSEY

NEW YORK, 210-212 West 65th Street — PITTSBURGH, 5114 Liberty Avenue



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attested by satisfied users — EVERYWHERE!

Sturdy Condensing Units from 80 to 2868 Lbs. I.M.E., and all other commercial refrigeration equipment—Wall type cases with machinery—A beautiful household line of modern, conservative styles—Write for full data.

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RANCO THERMOSTAT

The Stainless Steel **RANCO KRS** fills the replacement needs of practically every household refrigerator, water cooler and ice cream cabinet.

OVERSIZE DIAL PLATES are available for large mounting panel holes, and will be furnished in place of standard plates at no extra cost.

MARKING—Every model is stamped with factory code number and temperature settings. Lever and dial positions are plainly marked on the plate.

MAINTENANCE—Designed to reduce the cost of maintenance and repair. No broken bases or covers.

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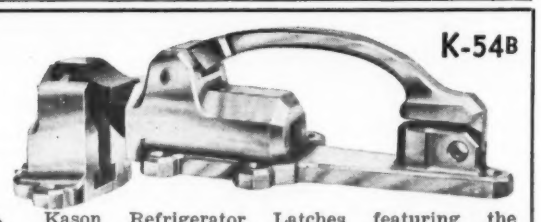
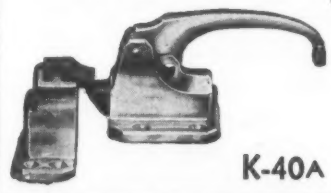
THE AUTOMATIC RECLOSING CIRCUIT BREAKER COMPANY
1300-10 Indianola Avenue, Columbus, Ohio

KASON Refrigerator **HARDWARE**

K-54B





K-40A

Kason Refrigerator Latches featuring the famous patented Micrometer strike for hairline offset adjustments and the rugged Forged Brass construction rank foremost in the field of refrigerator hardware. There is a Kason Lock for every refrigerator need.

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KASON HARDWARE CORPORATION
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We offer a binder designed and made especially for keeping your file copies of Electric Refrigeration News neat and always available for ready reference.

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The price is $3.75 shipped to you post paid in the United States and Possessions and Pan-American Postal Union countries. For all Foreign countries, postage based on a shipping weight of 6 pounds must be added to this price. Send your remittance with order. May we send you one?

Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

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Instantaneous Cooling

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Specialized Valves & Fittings for Refrigeration

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WRITE FOR BULLETINS DESCRIBING HENRY REFRIGERATION SPECIALTIES

QUESTIONS

Kelvinator Prices

No. 1988 (Dealer, New York)—"As a subscriber to ELECTRIC REFRIGERATION NEWS, I am wondering whether it would be possible for you to send me the retail American prices on the Kelvinator refrigerators.

"If there are different prices for different zones, I should prefer to have the prices quoted in the New York district."

Answer: Prices on Kelvinator household refrigerators were given in the May 30 specifications issue of ELECTRIC REFRIGERATION NEWS. You can check with the New York sales branch or with a local dealer for any changes that may have been made since that time.

EVERLASTINGLY—WE REPEAT

NO - SOLDERED - RETURN - BENDS

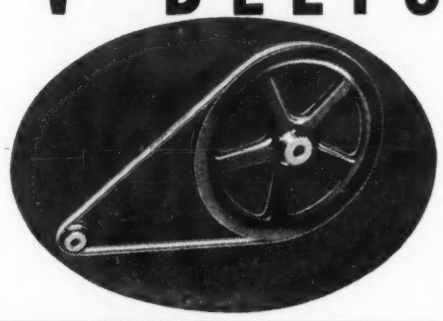
PEERLESS FIN COILS are made of CONTINUOUS tubing. Where there are NO joints there can be NO leaks, today—or ten years from today.

PEERLESS ICE MACHINE COMPANY

CHICAGO — 515 W. 35th ST.
TWO FACTORIES
NEW YORK — 43-00 36th ST. L.I.C.

DAYTON V-BELTS

There is a Dayton V-Belt made especially for all makes and types of refrigerators, washing machines and other appliances. A stock is available near you. Send for price list and name of your nearest distributor.



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The world's largest manufacturer of V-Belts

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The following special rates are for PAID-IN-ADVANCE subscriptions only in the United States and Possessions and Pan-American Postal Union Countries. Charge orders are billed at the single-subscription rate, regardless of number. Papers will be mailed to individual addresses.

	Electric Refrigeration News (weekly)	1935 Refrigeration Directory and Market Data Book (2 volumes)	Both Electric Refrigeration News and Refrigeration Directory
1 subscription	$3.00	$5.00	$6.50
5 or more each	2.75	4.50	6.50
10 or more each	2.50	4.00	6.50
20 or more each	2.25	3.50	5.75
50 or more each	2.00	3.00	5.00
75 or more each	1.75	2.50	4.25
100 or more each	1.50	2.00	3.50

Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

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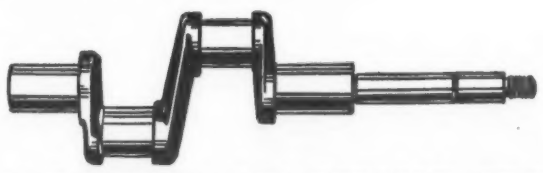
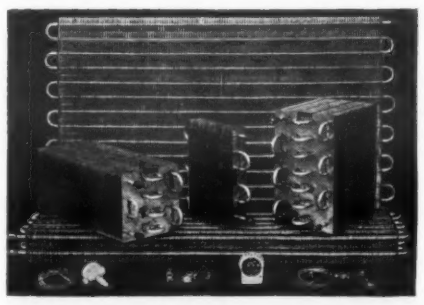
SHAFTS . . . Crank and Eccentric for Compressors, made to YOUR Specifications.



Manufacturers—Send Blue Prints for Quotations.

MODERN MACHINE WORKS, INC.
Specializing in the Manufacture of SHAFTS
2207 Kirkwood Ave. — Cudahy, Wisconsin



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Name .....

Attention of
In Care of .....

Street Address .....City and State .....

We sell the .....refrigerator and .....
(Please indicate other products or principal line of business.)
12-19-34.

Cabinet Production Heads

No. 1989 (Manufacturer, Illinois)—"Will you please give me the names and correct addresses of the following men:

"Superintendent of cabinet division, Norge Corp.

"Superintendent of cabinet division, Servel, Inc.

"Superintendent of cabinet division, Frigidaire Corp.

"Superintendent of cabinet division, Gibson Electric Refrigeration Corp."

Answer: Superintendent of the Norge cabinet division is Harry Spencer, Norge Corp., Muskegon, Mich.; superintendent of Servel's cabinet division is W. D. Collins, Servel, Inc., Evansville, Ind. Address E. R. Godfrey, vice president in charge of production, Frigidaire Corp., Dayton, Ohio; and John Lewis, vice president, Gibson Electric Refrigerator Corp., Greenville, Mich.

Commercial Unit Makers

No. 1990 (Manufacturer's agent, New York)—"Advise where we may find a survey covering commercial refrigeration compressor manufacturers in New York state and Northern Pennsylvania."

Answer: Manufacturers of commercial refrigeration compressors are listed starting on page 177 of the 1934 REFRIGERATION DIRECTORY. Manufacturers of complete commercial refrigeration systems are listed starting on page 258 of the 1934 REFRIGERATION DIRECTORY.

Replacement Parts

No. 1991 (Dealer, Massachusetts)—"Kindly inform me where I may get a catalogue in which there is a list of parts and fixtures for electric refrigerators, and in particular for the Copeland box."

Answer: Parts for Copeland electric refrigerators can be obtained by writing Copeland Refrigeration Corp., Holden and Lincoln Aves., Detroit, Mich.

Suppliers of replacement parts for electric refrigerators are listed on page 302 of the 1934 REFRIGERATION DIRECTORY. The 1935 REFRIGERATION DIRECTORY AND MARKET DATA BOOK, which will be out in February, will bring lists of suppliers up to date.

Sales in Midwest States

No. 1992 (Advertising Agency, Wisconsin)—"Do you have figures available showing total sales (either in number of refrigerators or in dollars and cents) in the states of Michigan, Indiana, and Ohio for the years 1930-1931-1932-1933 and 1934."

Answer: We have a record of sales by states as reported by the Refrigeration Division of National Electrical Manufacturers Association (Nema) for the years 1932 and 1933 and the first nine months of 1934.

Refrigeration manufacturers who are members of Nema made about 80 per cent of industry sales in 1932, 84 per cent in 1933 and approximately 88.4 per cent thus far in 1934. The sales for states requested are as follows:

	1932	1933	1934 (9 mo.)
Michigan	20,512	26,192	30,916
Indiana	11,082	18,266	26,976
Ohio	30,755	55,434	70,775

The figures represent the number of units sold to distributors and dealers by the manufacturers. Monthly sales by states reported by Nema are published in the weekly issues of ELECTRIC REFRIGERATION NEWS as soon as they are released.

Makers of 'Lume'

No. 1993 (Supplier, New York)—"Would you be kind enough to put us in touch with a manufacturer of a product known in the electrical field as 'lume.'

"We understand that it is used in connection with electrical work for covering bare wire. In the future we are furthermore advised it will be used to cover tubing in air-conditioning work.

"We are particularly interested in lume to cover ½-inch, ⅝-inch, ¾-inch, and 1-inch copper tubing. The three larger sizes will be more extensively used than the ½-inch."

Answer: Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., or General Electric Co., Schenectady, N. Y., should be able to supply you with lume.

Paper Milk Bottles

No. 1994 (Distributor, France)—"We are writing you as a subscriber of ELECTRIC REFRIGERATION NEWS for some information.

"You will find attached a paper milk bottle. Actually milk is sold in France only in bottles of glass, but the use of paper bottles would be a great development if it were possible to make them at a low enough price. Knowing that in the United States the use of paper bottles is quite current, we would be very grateful if you would refer us to two or three of the principal American manufacturers of this kind of bottles."

Answer: The following are manufacturers of paper milk bottles:

American Paper Bottle Co., 931 Brown Ave., Toledo, Ohio.

The Purity Paper Vessels Co., Clipper Mill, Baltimore, Md.

The Reed Co., Inc., 70 E. 45th St., New York City.

Sealright Co., Inc., First St., Fulton, N. Y.

Frozen Foods Publication

No. 1995 (Manufacturer, New York)—"We should appreciate it if you could give us any information as to the publishers of a paper called *Frozen Foods.*"

Answer: We do not know of a publication called *Frozen Foods.*

We formerly published a periodical called REFRIGERATED FOOD NEWS, which devoted considerable editorial attention to the subject of quick-frozen foods. We will be glad to select a group of issues dealing with frosted foods and send them to you at a cost of 10 cents each.

Contact to Govt. Orders

No. 1996 (Manufacturer, Michigan)—"We are wondering if you have the names of a few outstanding manufacturers' representatives in Washington, D. C. who do an exclusive business of soliciting government business in connection with electrical appliances such as refrigerators.

"We would greatly appreciate the names of a few outstanding people of this type, if you should have them."

Answer: We do not seem to have any name on record which meets your specifications, but it might be worthwhile to get in touch with the following:

Marshall T. Jones, National Power Survey, Federal Power Commission, Washington, D. C.

R. A. Lundquist, 17606 Muirland Ave., Detroit, Mich.

Mr. Jones was formerly head of the Electrical Equipment Division of the Bureau of Foreign and Domestic Commerce, Department of Commerce. He has a knowledge of the procedure connected with government purchasing.

Mr. Lundquist was also formerly connected with the Department of Commerce. Later he was in charge of export business for Kelvinator.

If these men are not available for the particular service you want, they may be able to advise you regarding a suitable individual as they both have a good acquaintanceship in Washington.

Sales by States

No. 1997 (Manufacturer, Ohio)—"You have been referred to us as a possible source of information covering the monthly sales by states of electric refrigerators in the United States. Would you please send us full information on this service, also giving us the annual cost."

Answer: Monthly sales of electric refrigerators by states through 1933 as reported by the Refrigeration Division of National Electrical Manufacturers Association (Nema) were published in the statistical section of THE 1934 REFRIGERATION DIRECTORY AND MARKET DATA BOOK. The 1935 REFRIGERATION DIRECTORY, which will be published in February, will bring these figures up to date.

Price of THE 1934 REFRIGERATION DIRECTORY is $3. The 1935 DIRECTORY, which will be in two volumes, will sell for $5.

Monthly sales of electric refrigerators by states are published in the weekly issues of ELECTRIC REFRIGERATION NEWS as soon as the sales figures are released by the Refrigeration Division of Nema.

Chrysler Acquires Stock In Commercial Credit

NEW YORK CITY—Announcement was made that Chrysler Corp. has completed arrangements for the acquisition of a substantial minority common stock interest in the Commercial Credit Co. of Baltimore.

Walter P. Chrysler, chairman of the board, Chrysler Corp., will become a director of the Commercial Credit Co., it was announced.

Commercial Credit, one of the largest finance companies in the instalment purchasing field, has in the past handled the instalment paper on retail sales of Chrysler automobiles.

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RATES: Fifty words or less, one insertion $2.00, additional words four cents each. Three insertions $5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS AVAILABLE

WANTED: Publicity assistant with ability to create and write publicity for trade journals and newspapers. Refrigeration and radio experience desirable. Must have executive capacity and be able to follow through with office details. State experience and salary. Box 658, Electric Refrigeration News.

A LARGE distributor of nationally known specialty appliances in central Pennsylvania desires the permanent services of a man to take charge of their sales training department. Consideration will be given only to experienced men with actual appliance sales and managing experience. Reply giving complete information and salary desired. Address Box 659 Electric Refrigeration News.

POSITIONS WANTED

SERVICE and installation man, 7 years' experience both household and commercial, desires position with factory, dealer or distributor. Prefer commercial field work. Can qualify as supervisor, having operated own service business in Chicago for 4 years. Available immediately. Can furnish good references. Would start with moderate salary in proper organization. Box 656, Electric Refrigeration News.

MANAGER, competent, to supervise sales and service, commercial and household, factory branch or large distributor. Can lay out commercial and air conditioning jobs. Eight years' experience refrigeration wholesale and retail. Or can effectively represent manufacturer of coils, cases or machine units. Territorial dealer set-up. Box 657, Electric Refrigeration News.

FRANCHISE WANTED

MANUFACTURER'S REPRESENTATIVE contacting Michigan concerns is interested in new lines to sell especially to mechanical refrigerator makers. If you have something new to offer, let us help. We know the men to see and can get to them. In business over fifteen years. Commission basis only. Exclusive representation only. Box 654, Electric Refrigeration News.

EQUIPMENT FOR SALE

USED ½ to 10 H.P. apartment multiple equipment for sale F.O.B. Chicago. For trade-in allowances by largest individual unit distributor. Examples: 2 H.P. Vilter, water cooled, methyl condensing unit complete with all controls—$75.00. 1½ H.P. Servel, counter-flow, water cooled with ice maker—$65.00. L. H. Rykken, 3434 Nordica Ave., Chicago.

COMPANY FOR SALE

FOR SALE: Largest and best stocked refrigerator and radio sales and service company in Southwest. Authorized sales and service for several radio and refrigerator manufacturers. All stocks, equipment, delivery truck, fixtures, store lease, goodwill, reserves, sales and service contracts included. No indebtedness. Poor health selling reason. Box 653, Electric Refrigeration News.

INDEPENDENT SERVICE COMPANIES

HALECTRIC thermostat repair service. B & B, G.E., Cutler-Hammer, Penn, Ranco, Tag., etc. Float valve needles reground and polished. Expansion valves repaired. Gas service, Ethyl, Methyl, Iso-Butane, Sulphur. Your cylinder or ours. Competitive prices. Distributors of "Flawless Brand" tubing. Halectric Laboratory, 1793 Lakeview Road, Cleveland, Ohio.

PROFESSIONAL SERVICE

HAVE your patent work done by a specialist. I have had more than 25 years experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. Van Deventer (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

SCHOOLS

MEN: Train for Refrigeration and Air Conditioning, at home, using same text material you would use in best resident school. Supervised individual instruction under licensed teacher with Doctor's degree. Shoeck School, Alton, Ill.

SERVICE

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Tubing, brass fittings, gaskets, thermostats, pressure gauges, valves, evaporators, expansion valves, filters, dehydrators and tools. Everything in refrigeration at lowest wholesale prices. Get our big FREE Catalog listing over 50,000 items for the Radio and Refrigeration Serviceman! ! ! Address Dept. ER-1219

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